Series 1938, No. 23 Issued February 1950

Soil Survey

Lee County Alabama

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UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Administration
Bureau of Plant Industry, Soils, and Agricultural Engineering
In cooperation with the
ALABAMA DEPARTMENT OF AGRICULTURE AND INDUSTRIES

HOW TO USE THE SOIL SURVEY REPORT

SOIL SURVEYS provide a foundation for all land use programs. This report and the accompanying map present information both general and specific about the soils, the crops, and the agriculture of the area surveyed. The individual reader may be interested in the whole report or only in some particular part. Ordinarily he will be able to obtain the information he needs without reading the whole. Prepared for both general and detailed use, the report is designed to meet the needs of a wide variety of readers of three general groups: (1) Those interested in the area as a whole; (2) farmers and others interested in specific parts of it; and (3) students and teachers of soil science and related agricultural subjects. Attempt has been made to meet the needs of all three groups by making the report comprehensive for purposes of reference.

Readers interested in the area as a whole include those concerned with general land use planning—the placement and development of highways, power lines, urban sites, industries, community cooperatives, resettlement projects, and areas for forest and wildlife management and for recreation. The following sections are intended for such users: (1) General Nature of the Area, in which location and extent, physiography, relief, and drainage, climate, vegetation, organization and population, industries, transportation and markets, and cultural development and improvement are discussed; (2) Agriculture, in which a brief history and the present status of the agriculture are described; (3) Productivity Ratings, in which are presented the productivity of the soils, which are grouped according to their relative physical suitability for agriculture; and (4) Land Use and Soil Management, in which the present uses of the soils are described, their management requirements discussed, and suggestions made for improvement.

Readers interested chiefly in specific areas—as some particular locality, farm, or field—include farmers, agricultural technicians interested in planning operations in communities or on individual farms, and real estate agents, land appraisers, prospective purchasers and tenants, and farm loan agencies. These readers should (1) locate on the map the tract with which concerned; (2) identify the soils on the tract by locating in the legend on the margin of the map the symbols and colors that represent them; and (3) locate in the table of contents in the section on Soils the page where each type is described in detail and information given as to its suitability for use and its relations to crops and agriculture. He will also find useful specific information relating to the soils in the section on Productivity Ratings.

Students and teachers of soil science and allied subjects—including crop production, forestry, animal husbandry, economics, rural sociology, geography, and geology—will find their special interest in the section on Morphology and Genesis of Soils. They will also find useful information in the section on Soils, in which are presented the general scheme of classification of the soils of the area and a detailed discussion of each type. For those not already familiar with the classification and mapping of soils, these subjects are discussed under Soil Survey Methods and Definitions. Teachers of other subjects will find the sections on General Nature of the Area, Agriculture, Productivity Ratings, and the first part of the section on Soils of particular value in determining the relations between their special subjects and the soils of the area.

This publication on the soil survey of Lee County, Ala., is a cooperative contribution from the—

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SOIL SURVEY OF LEE COUNTY, ALABAMA

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United States Department of Agriculture in cooperation with the Alabama Department of Agriculture and Industries

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[1] The field work for this survey was done while the Division was a part of the Bureau of Chemistry and Soils.

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LEE COUNTY, situated along the east-central border of Alabama, was settled in 1833. It is characterized by broad, smooth to gently sloping areas with some steep slopes and long narrow strips of flat first-bottom soils bordering the streams. Corn is grown in all parts of the county and occupies a large total acreage. Cotton, sweetpotatoes, and peanuts do well on the light-textured soils, and grains and grasses on those of heavier texture. Cotton is the main cash crop, and some income is derived from the sale of livestock. Cotton gins and processing plants, gristmills, and fertilizer factories are conveniently situated, and charcoal, lumber, and other forest products are trucked to the towns. To provide a basis for the best agricultural uses of the land a cooperative soil survey was begun in 1938 by the United States Department of Agriculture and the Alabama Department of Agriculture and Industries. The report here presented may be briefly summarized as follows.

SUMMARY

Lee County is situated about midway of the eastern boundary of Alabama. Opelika, the county seat, is 60 miles northeast of Montgomery; Auburn, the home of the Alabama Polytechnic Institute, is near Opelika.

The northern two-thirds of the county is in the Piedmont province, and the rest is in the Coastal Plain. The relief of the former is characterized by broad, smooth to gently sloping areas with some steep slopes, a prominent ridge extending across part of the county, and long narrow strips of flat first-bottom soils bordering the streams. The relief of the Coastal Plain part has a range from almost level to gently rolling, with some moderately steep slopes. Elevations are 300 to 850 feet above sea level, the Piedmont province part being 100 to 200 feet higher than the Coastal Plain. Except for a few small areas, the soils of the uplands are well to excessively drained, whereas the soils in the first bottoms vary from well to poorly drained.

The fairly mild climate favors the production of a wide variety of crops, and some hardy vegetables can be grown during winter or early spring. Rainfall is abundant and usually rather well distributed during the growing season.

The county was settled about 1833, the early settlers coming largely from Georgia and the Carolinas. Corn, oats, wheat, and other subsistence crops, as well as cotton, were grown at first. Cattle and hogs were raised for home consumption. Corn has been and still is grown on a large acreage. Cotton varies in acreage from year to year but has always been an important crop. In the present agriculture corn, hay, and peanuts are grown as subsistence crops, and cotton as a cash crop. Considerable income is obtained yearly from the sale of livestock.

The soils differ widely in their characteristics, and they are grouped into 8 major groups according to these characteristics. On the accompanying soil map are 65 different mapping units, comprising 41 types, 22 additional phases, and 2 classes of overflow first-bottom lands. The lay of the land and other soil characteristics are permanent features that are subject to slight modification through accelerated erosion. Many of the soils are capable of being built up to a good and even high state of productivity by growing and turning under leguminous crops or by the addition of barnyard manure and a liberal quantity of mineral fertilizer in connection with proper crop rotation. In most places the subsoils are sufficiently heavy but yet permeable enough to hold moisture and retain organic matter and mineral plant elements leached from the surface soil or not used by the previous crop. If it becomes necessary to increase the acreage of corn, cotton, hay crops, or peanuts, some suitable soils may be developed, whereas some steep slopes or severely eroded areas now under cultivation should be retired to permanent grass or reforested.

Lee County is in the Red and Yellow soil region of the United States. In this area are both Yellow Podzolic and Red Podzolic soils, and some of them are lateritic although no true Laterites are developed.

GENERAL NATURE OF THE AREA

LOCATION AND EXTENT

Lee County occupies an area about 38 miles from east to west and 23 miles from north to south in the east-central part of Alabama (fig. 1). The Chattahoochee River, here the State line between Alabama and Georgia, forms the eastern boundary. Opelika, the county seat, is 60 miles northeast of Montgomery and 105 miles southeast of Birmingham. The county has a total area of 612 square miles, or 391,680 acres.

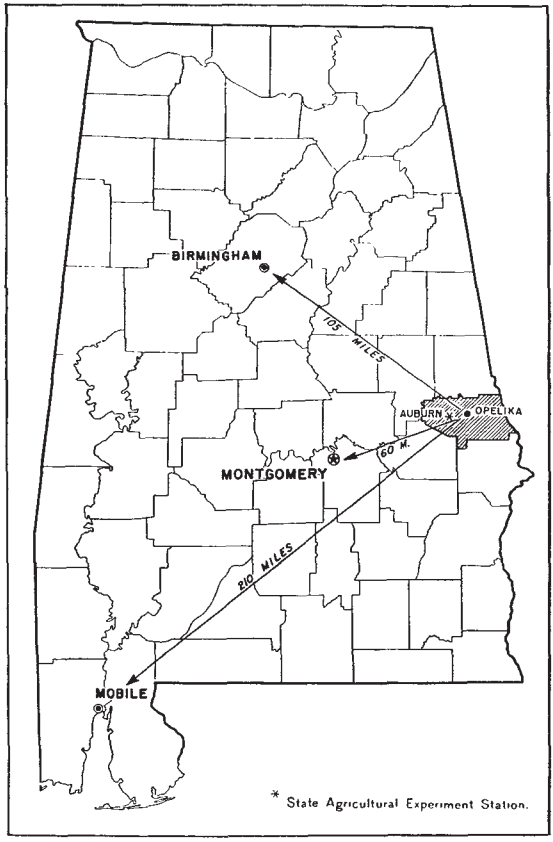


FIGURE 1.—Location of Lee County in Alabama.

PHYSIOGRAPHY, RELIEF, AND DRAINAGE

Physiographically the county is situated in both the Piedmont province and the Coastal Plain parts of the State. The northern two-thirds of it is in the former and the southern one-third in the latter. The boundary between these two physical divisions runs across the county in a general east-west direction, following the highway through

Loachapoka to Auburn, thence on an eastern to southeastern course until it leaves the county south of Bleecker.

That part of the county in the Piedmont province, where the rock formations are mainly of gneiss, granite, and schist, was at one time a plain, but geologic erosion has dissected it until at present the relief ranges from undulating or gently rolling to rolling or hilly and in some places very steep. Here and there remnants of the old plain remain as narrow winding ridges between streams. The ridge crests are relatively smooth, but the slope to the streams varies from gentle to rather steep. Steep, stony, rocky ridges are near Chewacla State Park southwest of Spring Villa State Park, 3 miles north of Salem, and in the northwestern corner of the county to the south of Roxana and along Sougahatchee Creek. Other rugged broken areas are in the eastern part of the county near Goat Rock and Bartletts Ferry Dams. That part in the Coastal Plain was once a broad, smooth, almost level plain; but now it has been dissected by stream action, leaving rather broad smooth ridge tops that have gradual slopes to the streams or first bottoms. From Mitchell Crossroads to the northeastern corner of Macon County these slopes are short and steep. In both the Coastal Plain and the Piedmont province are narrow flat first bottoms along the streams.

With the exception of the few first-bottom areas along the streams and small sinks or flats the county is well to excessively drained. Most of the streams have considerable fall and have cut narrow channels 50 to 200 feet below the general level of the area; some water power could be developed along them. The eastern half is drained by Halawakee, Wacoochee, and Little Uchee Creeks and their tributaries, which flow into the Chattahoochee River; and the western half mainly by Sougahatchee and Chewacla Creeks, which empty into the Tallapoosa River, outside the county.

The elevations [2] range from 300 to 850 feet above sea level. The Piedmont province part is 100 to 200 feet higher than the Coastal Plain. In the vicinity of Opelika the elevation is 750 to 823 feet, at Auburn 718 feet, and at Smiths Station 522 feet. The ridge tops in the northern part are 700 to 830 feet above sea level. The highest points are on the old mountainlike ridges about 3 miles north of Salem.

CLIMATE

The climate of Lee County is continental, and the difference between winter and summer mean temperatures is 29.6° F. Summer temperatures of 100° or more are uncommon, as are winter temperatures of less than 20°. Temperatures as high as 108° and as low as 4° have been recorded by the United States Weather Bureau station at Auburn, and the average annual temperature is 64.6°. Winters are short and mild and snow is uncommon, although there is a trace of it during most winters. Occasionally the soil freezes to a depth of 1 to 3 inches, but it thaws within 1 or 2 days. Normally the land can be plowed in winter; however, there may be periods of 2 or 3 weeks when the heavy soils especially may be too wet for plowing. Winter

[2] The elevations are taken from the United States Geological Survey topographic maps.

cover crops and vegetables, as collards, onions, and turnips, make some growth during the winter season and are rarely seriously injured by the cold.

Summers are long and warm, but the nights are not generally uncomfortably warm. Rainfall is fairly well distributed through the growing season and is normally sufficient for all the crops. The average annual precipitation, as recorded at Auburn is 53.58 inches. Severe windstorms occur sometimes in March and April, although the county has not had very severe storms. The average date of the last killing frost is March 26, and that of the first is November 11, giving an average frost-free season of 230 days, which is ample for the maturity of all crops commonly grown. Killing frosts, however, have occurred as late as April 25 and as early as October 21.

The normal monthly, seasonal, and annual temperature and precipitation at Auburn are given in table 1.

TABLE 1.—*Normal monthly, seasonal, and annual temperature and precipitation at Auburn, Lee County, Ala.*[1]

[Elevation, 732 feet]

Month	Temperature			Precipitation			
	Mean	Absolute maximum	Absolute minimum	Mean	Total for the driest year	Total for the wettest year	Average snowfall
	°F.	°F.	°F.	Inches	Inches	Inches	Inches
December	49.1	84	9	5.79	2.10	4.74	(2)
January	48.2	81	4	4.62	2.88	4.28	(2)
February	51.2	81	7	5.51	9.78	9.61	0.3
Winter	49.5	84	4	15.92	14.76	18.63	.3
March	56.4	89	14	5.77	2.54	17.47	.1
April	64.1	92	29	4.38	2.38	5.32	(2)
May	71.6	98	38	3.75	1.98	7.05	.0
Spring	64.0	98	14	13.90	6.90	29.84	.1
June	77.9	104	46	4.04	.18	4.19	.0
July	79.9	108	57	5.49	2.34	1.63	.0
August	79.4	106	53	4.68	5.03	1.53	.0
Summer	79.1	108	46	14.21	7.55	7.35	.0
September	76.1	108	44	3.18	1.47	4.55	.0
October	66.1	97	29	2.99	3.17	4.04	.0
November	55.5	89	12	3.38	.72	6.83	(2)
Fall	65.9	108	12	9.55	5.36	15.42	(2)
Year	64.6	[3] 108	[4] 4	53.58	[5] 34.57	[6] 71.24	.4

[1] From U. S. Weather Bureau records.
[2] Trace.
[3] In 1925 and 1930.
[4] In 1886.
[5] In 1894.
[6] In 1929.

VEGETATION

This county is in the forest region of the United States and the entire area was at one time covered by hardwoods and pines. At present there is very little of the original vegetation, as probably 90 to 95 percent of the area has been cultivated at one time or another. The dominant second-growth trees are shortleaf pine (*Pinus echinata* Mill.), loblolly pine (*P. taeda* L.), and longleaf pine (*P. palustris* Mill.). The term "oldfield pine" is often used to indicate second growth of short-

leaf and loblolly pines. Other important trees are shagbark hickory (*Carya ovata* (Mill.) K. Koch), mockernut (*C. tomentosa* (Lam.) Nutt), white oak (*Quercus alba* L.), post oak (*Q. stellata* Wangh.), water oak (*Q. nigra* L.), yellow-poplar or tuliptree (*Liriodendron tulipifera* L.), red gum (*Liquidambar styraciflua* L.) (locally known as sweetgum), black tupelo (*Nyssa sylvatica* Marshall) (locally known as blackgum), and redcedar (*Juniperus virginiana* L.). Other trees are dogwood, sassafras, persimmon, red maple, locust, blackjack oak, and bay. Broomsedge grows in idle or abandoned fields, and carpet grass, lespedeza, Bermuda grass, and Dallis grass in pastures. Some so-called nutgrass grows in places, but it is not a common pest.

ORGANIZATION AND POPULATION

The first settlers in this area, chiefly of English descent from Georgia and the Carolinas, arrived about 1833. The county was organized in 1866 from parts of Tallapoosa, Russell, and Chambers Counties and named in honor of Gen. Robert E. Lee of Virginia. In 1940 the population was 36,455.

INDUSTRIES

Cotton gins and gristmills are situated in convenient places. Two cotton processing plants are in the county, one at Pepperell and the other at Opelika. A creamery and mills processing cottonseed and making fertilizers are in Opelika. Logs are sawed into lumber and the lumber trucked to towns. A few farmers make charcoal and market it in Opelika and in Columbus, Ga.

TRANSPORTATION AND MARKETS

The county is provided with excellent freight and passenger service by the Central of Georgia Railway and the Western Railway of Alabama. Opelika is the junction point of these railroads as it also is of United States Highways Nos. 29 and 241. In addition to these paved highways, graded and surfaced roads are located throughout the better developed areas of the county. United States Highway No. 80, an important transcontinental highway, crosses the southern part of the county.

Opelika is the largest and most centrally located market for farm products, although considerable quantities are sold in Auburn, Salem, Loachapoka, Montgomery, and Phenix City, Ala., and Columbus and West Point, Ga. Numerous small stores are scattered throughout, where food, clothing, and farm supplies may be purchased.

CULTURAL DEVELOPMENT AND IMPROVEMENT

A good public school system is provided for white children. Consolidated schools are at Beulah, Smiths Station, Salem, Loachapoka, Opelika, Auburn, and Beauregard. The Alabama Agricultural Experiment Station and the Alabama Polytechnic Institute are at Auburn. Schools for Negroes, chiefly one-room type, and churches for whites and Negroes are situated in all parts of the county.

Some rural communities have electric power and telephone service. In 1940, electric distribution lines were within a quarter mile of dwellings on 761 farms. Dwellings lighted by electricity from a power

line were reported by 344 farms and from home plants by 13 farms. Rural mail routes reach all localities.

AGRICULTURE

The early settlers, many of whom were slave owners, would clear a tract of land, farm it for several years, and then abandon it, new fields being cleared. Land was cheap and abundant, slave labor plentiful, and landholdings usually large.

One of the more important changes in agricultural practices to maintain soil fertility has been the increased use of fertilizer, crop rotation, and soil improvement crops to replace the old practice of clearing new land as soon as yields decreased on land under cultivation. Erosion has been an increasing problem. Terracing has been practiced for 70 years or more, and there has been a marked attempt to improve and extend terrace systems during the past 6 or 8 years.

Slow transportation and communication made it imperative to raise larger acreages of subsistence crops. The land was planted to corn wheat, oats, and cotton; some cows and many hogs were raised. Cotton, the main cash crop, increased steadily up through 1909, but in 1919 it decreased, owing to the ravages of the boll weevil. In 1939, 32,382 acres produced 10,777 bales. Acreage in corn varies, but in 1939 that of 54,363 acres was an all-time high.

The acreage of the more important crops grown in stated years is given in table 2.

TABLE 2.—*Acreage of principal crops and number of bearing apple, peach, and pecan trees in Lee County, Ala., in stated years*

Crop	1879	1889	1899	1909	1919	1929	1939
	Acres	*Acres*	*Acres*	*Acres*	*Acres*	*Acres*	*Acres*
Corn for grain	30,137	31,112	38,430	34,235	46,809	34,575	54,363
Oats	11,918	9,638	5,145	6,317	588	[1] 2,566	[2] 4,537
Wheat	8,697	586	2,018	149	473	14	10
Field peas			2,012	5,118	2,442	574	4,984
Field beans			20	52		308	4,448
Peanuts			101	43	254	276	2,669
Sugarcane and sweet sorghums for sirup	[3] 208	1,149	1,174	610	1,490	571	1,025
Market vegetables					113	438	379
Hay and forage	[4] 273	[4] 545	990	1,649	1,893	1,562	5,189
Potatoes		92	142	92	85	61	141
Sweetpotatoes	925	1,323	971	1,085	1,378	1,052	1,408
Cotton	51,889	58,447	69,104	79,261	57,253	56,796	32,382
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Apples, trees [5]		7,576	13,938	10,895	5,739	3,349	3,887
Peaches, do [5]		45,780	62,210	51,085	26,958	30,456	18,955
Pecans, do [5]			327	501	1,922	9,710	14,093

[1] Includes 2,383 acres cut and fed unthreshed.
[2] Includes 3,690 acres cut and fed unthreshed.
[3] Sugarcane only.
[4] Hay only.
[5] Trees as of census years 1880 to 1940.

As few horses or tractors are in the county, farm power is largely supplied by mules. On April 1, 1940, there were 511 horses and 3,585 mules over 3 months old on farms. Most of the tilling and planting operations are done by small units, and some planting is done by hand. Cultivation is done almost entirely with a single-mule plow or cultivator. Investment in farm machinery was only 5.6 percent of the total farm investment in 1940, that in farm buildings, 25.7 percent; how-

ever, there is considerable range in the buildings on different farms. Some farms have a large well-kept house with several barns and sheds housing all livestock, feed, and implements, while on many others is a small cheaply built poorly maintained house with a very small barn or shed. The owner-operator usually has a fair to good house with sufficient buildings for his needs.

A few farms have dairy herds of 5 to 20 cows. Most of the dairy products from these herds are consumed in the county or adjoining counties. The cattle are largely purebred or good grade Jersey or Guernsey. Many farmers keep 1 to 4 milk cows, some of which are scrub cattle. In 1939, 4,733 cows were milked on 1,909 farms, producing 1,855,173 gallons of milk and 351,723 pounds of butter. The total number of cattle over 3 months old on April 1, 1940, was 12,108. A marked increase in the number of cattle, hogs and pigs, and chickens on farms has been made since 1930.

Most farmers keep 6 to 15 chickens for home supply, while a few have 50 to 300 from which they derive considerable cash income by selling the products in towns. In 1939, 124,284 chickens were raised, 33,407 of which were sold alive or dressed. On April 1, 1940, a total of 62,191 chickens over 4 months old was reported.

Nearly all farmers raise sufficient hogs for home use and some raise a few for sale in nearby towns or city markets. A total of 7,741 hogs and pigs over 4 months old was reported on farms on April 1, 1940.

The percentage of rural population shows a steady decline, from 88.1 to 56.9 percent from 1880 to 1930, with a corresponding increase in urban population. In 1940, the total population was 36,455, of which 23,316 (64.0 percent) was rural, with a density of 38.1 a square mile. The total rural-farm population was 18,539, of which 5,515 were white and 13,024 Negroes. The total population consisted of 43.5 percent white and 56.5 percent Negro.

The value of certain agricultural products by classes is shown in table 3.

In 1939, 87 percent of the farms reported the use of commercial fertilizer at a cost of $211,605, an average of $89.17 a farm. Liming materials also were purchased by 57 farms at a cost of $2,002. The price of cotton and other economic conditions largely determine the quantity of fertilizer used. Usually ready-mixed, high-grade, complete fertilizers containing 16 to 20 pounds of plant nutrients per hundred pounds are used. Considerable quantities of nitrate of soda are used.

In 1939 (1940 census), 945 farms, or 34.8 percent of all farms spent $216,274, or an average of $228.86 per farm, for labor. Labor is supplied by resident Negroes and white laborers, the majority being Negro. Hands are hired by day, month, or year, depending on individual farming conditions. The number of laborers has declined recently as many have moved to industrial centers because of high wages. During the same year 533 farms (19.6 percent) spent $97,104, averaging $182.18 per farm, for feed.

The size of individual farms ranges from 3 acres or less to 1,000 acres or more; the average size for 2,715 farms reported in 1940 was 115.7 acres. After 1880, when the average size of farms was 133 acres, farms decreased in size until 1920. Since that time the acreage

TABLE 3.—*Value of agricultural products, by classes, in Lee County, Ala.*

Products	1909	1919	1929	1939
Cereals	$402,903	$1,026,438	$376,788	$312,726
Corn harvested for grain	(1)	(1)	372,720	305,425
Other cereals	(1)	(1)	4,068	7,301
Other grains and seeds	42,823	73,069	21,941	66,227
Hay and forage	35,865	65,445	15,628	92,786
Cotton	(1)	(1)	1,464,741	637,472
Vegetables	151,256	372,735	201,637	180,662
For sale [2]	(1)	(1)	24,545	11,627
For farm households' use [2]	(1)	(1)	77,146	85,113
Potatoes and sweetpotatoes	(1)	(1)	99,946	83,922
Fruits and nuts	36,319	60,259	27,920	37,903
Horticultural specialties sold	(1)	(1)	56,378	55,551
All other crops	2,059,514	3,015,801	39,751	29,045
Forest products sold	(1)	(1)	61,380	19,702
Total	2,728,680	4,613,747	2,266,164	1,432,074

Livestock products	
Dairy products sold	
Whole milk	
Cream [3]	
Butter	
Livestock sold and slaughtered	
Cattle and calves	
Hogs and pigs	
Poultry and eggs produced	
Honey produced	
Wool shorn	
Total	

[1] Not available.
[2] Excludes value of potatoes and sweetpotatoes.
[3] Includes value of sweet cream a
[4] Includes value of wax.

has been increasing. In 1880 and 1890, 52.0 percent and 56.6 percent, respectively, of the farms were operated by tenants. Since that time farm tenancy has increased, and over two-thirds of the farms were operated by tenants (67.8 percent) in 1940; less than 1 percent by managers; and 31.9 by owners and part owners. White tenants operated 19.6 percent of the farms, and white owners 21.4 percent. Negroes operated 58.8 percent of the farms, of which 10.5 percent were owners. Computed on acreages (census figures), owners and part owners operated 46.9 percent of the farm land of the county.

Two systems of rental are common. One locally known as the "share cropping" system is where the landowner furnishes the land, tools, work animals, feed for stock, half of the seed and fertilizer, and receives one-half of all crops grown. The other system is to rent the land for one-third the corn and hay crops and one-fourth the cotton crop. Cash rentals of $3 to $5 an acre are common.

SOIL SURVEY METHODS AND DEFINITIONS

In making a soil survey the soils are examined, classified, and mapped in the field and their characteristics recorded, particularly in regard to the growth of various crops, grasses, and trees.

The soils and the underlying formations are examined systematically in many locations. Test pits are dug, borings made, and highway or railroad cuts and other exposures studied. Each exposes a series of distinct soil layers, or horizons, termed collectively the soil profile. Each horizon, as well as the underlying parent material, is studied in detail, and the color, structure, porosity, consistence, texture, and content of organic matter, roots, gravel, and stone are noted. The chemical reaction of the soil and its content of lime and salts are determined by simple tests.[3] Other features taken into consideration are the drainage, both internal and external, the relief, or lay of the land, and the interrelations of soil and vegetation.

The soils are classified according to their characteristics, both internal and external, with special emphasis upon the features that influence the adaptation of the land to the production of crop plants, grasses, and trees. On the basis of these characteristics the soils are grouped into classification units, the principal three of which are (1) series, (2) type, and (3) phase. In some places two or more of these principal units may be in such intimate or mixed pattern that they cannot be clearly shown separately on a small-scale map but must be mapped as (4) a complex.

The series is a group of soils having the same genetic horizons, similar in their important characteristics and arrangement in the profile and having similar parent material. Thus, the series comprises soils having essentially the same color, structure, natural drainage, and other important internal characteristics and the same range in relief. The texture of the upper part of the soil, including that commonly plowed, may vary within a series. The series are given geographic

[3] The reaction of the soil is its degree of acidity or alkalinity expressed mathematically as the pH value. A pH value of 7 indicates precise neutrality; higher values, alkalinity; and lower values, acidity. Indicator solutions are used to determine the chemical reaction. The presence of lime is detected by the use of a dilute solution of hydrochloric acid.

names taken from localities near which they were first identified. Cecil, Appling, Davidson, Norfolk, and Ruston are names of important soil series in Lee County.

Within a soil series are one or more types, defined according to the texture of the upper part of the soil. Thus, the class name of this texture—sand, loamy sand, sandy loam, silt loam, clay loam, silty clay loam, or clay is added to the series designation to give a complete name to the soil type. Cecil sandy loam and Cecil clay loam are soil types within the Cecil series. Except for the texture of the surface soil, these types have approximately the same internal and external characteristics. The soil type is the principal unit of mapping, and because of its specific character it is usually the unit to which agronomic data are definitely related. In comparisons of the type and phases of that type, to avoid the repetition of their complete names, the type is sometimes referred to as the normal phase.

A soil phase is a variation within the type, each phase differing from the others in some feature, generally external, that may be of special practical significance. For example, within the normal range of relief of a soil type some areas may be adapted to the use of machinery and the growth of cultivated crops and others may not. Differences in relief, stoniness, and degree of accelerated erosion may be shown as phases. Even though no important differences may be apparent in the soil profile or in its capability for the growth of native vegetation throughout the range in relief, there may be important differences in respect to the growth of cultivated crops. In such instances the more sloping parts of the soil type may be segregated on the map as a sloping or a hilly phase. Similarly, some soils having differences in stoniness may be mapped as phases, even though these differences are not reflected in the growth of native plants.

An example of a soil complex is found in Gilead-Susquehanna sandy loams, eroded sloping phases, in which the soils are so intimately associated that they cannot be separated on a map of the scale used.

The soil surveyor makes a map of the county or area, showing the location of each of the soil types, phases, and complexes in relation to roads, houses, streams, lakes, section and township lines, and other cultural and natural features of the landscape.

SOILS

The soils of Lee County are predominantly light-colored and exhibit all shades of color from light gray, yellowish gray, or brownish gray to reddish brown and red. The lightest colored ones are in the Coastal Plain, or so-called sandy part, whereas the brown and red colors prevail in the Piedmont province; particularly is this true of the color of the subsoil. Most of the soils are low in organic matter. Both the soil and subsoil range from slightly acid to very strongly acid. The texture ranges from sand and sandy loam to clay loam. The consistence of the subsoil varies from loose and friable to moderately compact and plastic. Most of the soils occur on slopes of 2 to 8 percent.

Some rounded quartz gravel is present on the surface and mixed with the soil in some places in the Coastal Plain, particularly along the boundary line between the Coastal Plain and the Piedmont

province. Angular quartz fragments and fragments of gneiss and hornblende schist are scattered locally over the surface in the Piedmont province.

Areas of considerable size having sloping, rolling, or hilly relief require terracing, strip cropping, and contour cultivation if used for clean-cultivated crops, as well as the growing of sod and close-growing crops to prevent too great a loss of soil from surface wash. Erosion, both surface wash and gullying, are very noticeable in the northern part. Considerable erosion has taken place where the slope is not more than 4 or 5 percent. On large areas of Cecil sandy loam much of the sandy surface soil has been removed through sheet erosion, thus exposing the red clay subsoil. Growing clean-cultivated crops year after year on the same areas is largely responsible for this eroded condition. Many of the steeper slopes should never have been cleared of their native vegetation. Some of these areas were farmed for a few years, became eroded, were abandoned, and have grown up to shortleaf and loblolly pines.

The Piedmont province and Coastal Plain physiographic divisions also furnish a basis for two important groups of soils. In the first, or northern two-thirds of the county, the soils have formed from the weathered products of the underlying rocks, whereas in the southern part they have formed from the weathering of beds of sand, sandy clay, and clay. The soils in these two regions differ widely in color, texture, consistence, and chemical composition because of the influence of the underlying materials.

On the basis of similar characteristics the soils have been grouped into series and, in turn, the series subdivided into individual soil types and their phases according to the texture of the surface soil. The Cecil, Appling, and Durham soils are closely related in the kind of parent material from which they have developed, the underlying rock being mainly granite, gneiss, and schist. The soils of the Cecil series are characterized by either yellowish-gray or brown to reddish-brown surface layers and red stiff moderately compact clay subsoils. The Durham soil is yellowish gray in the surface layer and has yellow or light yellowish-brown moderately friable clay subsoil, whereas the Appling soils are intermediate in color, particularly in the subsoil, between the Cecil and Durham.

Closely related to the above soils are the Madison and Louisa soils, which are underlain by and developed from weathered products of quartz mica schist. The Madison soil has a normal profile development—that is, it has a good firm moderately friable upper subsoil, whereas the subsoil of the Louisa is very friable and micaceous, with a slick greasy feel when rubbed between the fingers. All these soils, particularly those derived from parent materials from granite, gneiss, and schist, contain some potash but are low in calcium. The soils underlain by dark-colored basic rocks are low in potash content but relatively high in calcium and iron.

The Davidson and Iredell soils are developed from dark-colored basic rock, as hornblende schist and diorite. The Davidson soils are dark reddish brown and have dark-red heavy moderately compact clay subsoils. Usually the subsoil is 3 to 6 feet thick. The Iredell soil is brownish gray or medium gray in the surface layer and is characterized by light yellowish brown with a greenish tinge, with a heavy

plastic clay subsoil, and the dark-green soft disintegrated basic rock is usually within 2 or 3 feet of the surface. In some parts of the county there is a mixture of gneiss and hornblende schist. From this mixed condition of parent materials has developed the Lloyd soils. They resemble the Davidson in color, but contain more sand throughout the soil and subsoil and have intermediate characteristics between the Davidson and the Cecil.

Along the border line of the Coastal Plain and Piedmont province is a shallow covering of sandy Coastal Plain material over the red or yellowish-brown clays, which have come from the same parent material as the Cecil, Appling, and Durham soils. The Bradley and Chesterfield soils have developed under such conditions, the Bradley having a red clay subsoil resembling that of the Cecil, whereas the Chesterfield are somewhat similar in color to the Appling and Durham. These soils have about the same agricultural value as the Norfolk or Ruston soils in the Coastal Plain. This is particularly true where the sandy covering over the heavy clays is 8 to 20 inches deep or more.

The Georgeville, Herndon, and Goldston soils differ in their characteristics from the above-described soils because they are developed from fine-grained rock, mainly slate or quartz schist, and their texture is dominantly silty. In some places it is somewhat difficult to differentiate Georgeville silty clay loam from Cecil clay loam because both have almost the same color in the soil and subsoil. The Edgemont soils, which occupy the ridges and mountains, are developed from the underlying quartzite, quartz schist, and conglomerates. Since this parent material is different from any other in the county, these soils are also different in their characteristics.

The soils in the Coastal Plain have developed from unconsolidated beds of sand, sandy clay, clay, and gravel. The Norfolk, Marlboro, Gilead, and Ruston soils have sandy surface soil and dominantly friable sandy clay subsoil but differ in color and consistence. The Norfolk soils, having yellowish-gray surface soil and yellow friable sandy clay subsoil, are the most important in area and in agriculture in this group; the Marlboro differs from the Norfolk in having more fine material, a browner color, shallower surface layer, and slightly heavier consistence; the Gilead are distinguished from the Norfolk mainly because of the compact and slightly cemented sandy clay subsoil, which immediately underlies the loose sandy surface; the Ruston has about the same consistence and texture as the Norfolk soils but differs from them in having a yellowish-brown subsoil. The Norfolk, Marlboro, and Ruston have friable sandy clay substrata, whereas the Gilead material is much heavier in most placess

The Susquehanna, Macon, and Eutaw soils are developed from the underlying beds of heavy clay. The Susquehanna and Macon are closely associated, but the Macon is browner throughout the profile. The Eutaw differs from them in that it is lighter colored, having a brownish-gray surface soil and gray sticky mottled subsoil. Areas of Grady and Plummer soils occur as slight depressions and at the base of slopes, respectively. These soils differ mainly in the consistence of the subsoil.

Small areas of Hiwassee and Altavista soils, occurring on second bottoms or high terraces, have developed from old alluvial material washed from the soil in the Piedmont province. On similar positions

in the Coastal Plain there are small areas of Kalmia and Myatt soils where the materials have washed from the sandy uplands. In the first bottoms along the streams in the Piedmont province and extending for some distance into the Coastal Plain are narrow strips of Congaree and Chewacla soils, which have developed from materials washed from the soils of the Piedmont province and deposited by the streams at times of overflow. Similarly, in the first bottoms along the streams of the Coastal Plain, where the materials have washed from the sandy soils of the upland, are small areas of Iuka and Bibb soils. Alluvial soils (Bibb soil material) and Alluvial soils (Wehadkee soil material) occur in the first bottoms along the streams throughout the area.

The characteristics and relations between the soil series are given in table 4.

DESCRIPTIONS OF SOIL UNITS

In the following pages the soils of the county are described in detail and their agricultural relations discussed. Their location and distribution are shown on the accompanying map, and their acreage and proportionate extent are given in table 5.

TABLE 5.—*Acreage and proportionate extent of the soils mapped in Lee County, Ala.*

Soil type	Acres	Per-cent	Soil type	Acres	Per-cent
Alluvial soils:			Grady sandy loam	256	0.1
Bibb soil material	18,560	4.7	Guin sandy loam, steep phase	7,168	1.8
Wehadkee soil material	19,968	5.1	Helena sandy loam	2,432	.6
Altavista sandy loam	192	(1)	Herndon fine sandy loam	1,536	.4
Appling sandy loam	2,880	.7	Hiwassee fine sandy loam	320	.1
Rolling phase	832	.2	Iredell loam	512	.1
Bibb silt loam	832	.2	Iuka silt loam	640	.2
Bradley sandy loam	2,560	.7	Kalmia sandy loam	640	.2
Sloping phase	2,496	.6	Lloyd clay loam, rolling phase	192	(1)
Cecil clay loam	6,464	1.7	Lloyd sandy loam	1,664	.4
Hilly phase	27,328	7.0	Lloyd stony loam, rolling phase	7,232	1.9
Rolling phase	12,288	3.1	Louisa clay loam	960	.2
Cecil sandy loam	9,792	2.5	Rolling phase	4,480	1.2
Eroded phase	45,312	11.6	Louisa sandy loam, eroded rolling phase	5,632	1.4
Eroded rolling phase	46,336	11.8	Macon very fine sandy loam	1,408	.4
Chesterfield sandy loam	14,208	3.6	Madison sandy loam	4,032	1.0
Deep phase	3,776	1.0	Marlboro sandy loam	1,408	.4
Sloping phase	15,488	4.0	Myatt sandy loam	192	(1)
Chewacla silt loam	3,264	.8	Norfolk loamy sand	1,984	.5
Congaree sandy loam	896	.2	Norfolk sand	11,584	3.0
Congaree silt loam	6,400	1.6	Sloping phase	4,672	1.2
Davidson clay loam	8,832	2.3	Norfolk sandy loam	6,976	1.8
Rolling phase	4,544	1.2	Deep phase	10,112	2.6
Durham sandy loam	1,280	.3	Sloping phase	320	.1
Edgemont stony loam	3,072	.8	Plummer sandy loam	896	.2
Steep phase	3,776	1.0	Ruston sandy loam	896	.2
Eutaw clay	192	(1)	Starr loam	1,024	.3
Flint sandy loam	384	.1	Susquehanna clay	192	(1)
Georgeville silty clay loam	2,368	.6	Sloping phase	1,088	.3
Gilead sandy loam	14,912	3.8	Susquehanna fine sandy loam	320	.1
Eroded phase	4,608	1.2	Wilkes sandy loam	10,176	2.6
Eroded sloping phase	13,632	3.5	Worsham sandy loam	1,664	.4
Gilead-Susquehanna sandy loams, eroded sloping phases	1,344	.3			
Goldston slaty loam	256	.1	Total	391,680	100.0

[1] Less than 0.1 percent.

ALLUVIAL SOILS

The alluvial soils are developed from materials washed from soils in the uplands of both the Piedmont province and the Coastal Plain and deposited by the streams at times of overflow. Because of the

mixed texture and variable drainage conditions these soils cannot be classified into definite types. They are separated on the soil map into Alluvial soils (Wehadkee soil material) and Alluvial soils (Bibb soil material) because the materials from the Piedmont province differ in both chemical and physical composition from the materials washed from the Coastal Plain.

Alluvial soils (Bibb soil material).—This mapping unit of the first bottoms is made up of recently deposited sand, silt, and clay. It occupies a total of 18,560 acres in narrow areas along most of the streams of the Coastal Plain. The surface is nearly flat and only 2 to 3 feet above the water table. Frequent overflows occur at any time during the year; drainage is generally insufficient for most crops.

The 6- to 8-inch surface layer consists of dark-gray sand to sandy loam usually fairly high in organic matter. Occasional small areas have had as much as 12 inches of light-gray to yellowish-gray sand deposited during the last 4 or 5 years. Below a depth of 8 to 10 inches is gray, dark-gray, or mixed dark-gray and light-gray sand, sandy loam, silt, and clay mixed or in separate alternating layers. The conditions found in mapped areas of this type are extremely variable.

Small patches of sugarcane and sorghum are grown, for about 1 percent of the soil is cultivated chiefly to crops for sirup. Corn yields 10 to 30 bushels an acre during moderately dry seasons and when not damaged by overflow water. Some areas are especially well suited to pasture. When the forest growth has been removed, carpet grass does well on better drained areas. Dallis grass may be grown if carpet grass is held in check.

About 95 percent of the forested areas produce mostly water oak, post oak, pin oak, sweetgum, black tupelo, beech, yellow-poplar, sycamore, and some oldfield pine. These forested areas are used for range land pasture, as an abundance of undergrowth, including some canes, furnishes grazing.

Alluvial soils (Wehadkee soil material).—This recent poorly drained alluvial material occurs usually in narrow elongated areas that extend along most of the streams in the northern part of the county and for some distance into the Coastal Plain. A total of 19,968 acres is mapped. The surface is nearly flat and is only 2 or 3 feet above the water table during the drier parts of the year. During any part of the year the land is subject to frequent overflows.

The 8- to 10-inch surface layer is gray to brown loamy sand to sandy loam, in places fairly high in organic matter but often low. Below this, to a depth of 3 or 4 feet, is mixed sand, silt, and clay material varying in color from brownish gray mottled with gray to gray mottled with brown.

About 95 percent of the forested areas consists of various oaks, sycamore, sweetgum, black tupelo, yellow-poplar, and other less important species. These areas are used for range land, as the underbrush, including some canes, furnishes grazing.

This soil has exceptionally good possibilities for pasture purposes if the stream channels are straightened and deepened, the timber removed, and the areas seeded to Dallis grass and possibly Persian clover and white Dutch clover. Lespedeza may also be grown, but

overflows may destroy it. Dallis grass and Persian clover withstand overflows of 4 or 5 days' duration, therefore, these crops are particularly suited to these areas, especially Dallis grass. Carpet grass is well suited, but it tends to be a pest, as it chokes out the more desirable grasses and plants. The use of phosphate and lime or basic slag is recommended.

ALTAVISTA SERIES

The soil of the Altavista series has light-colored surface soil and yellow to light yellowish-brown fairly compact subsoil. It occurs on level or undulating second bottoms or terraced positions in the Piedmont province that extend into the Coastal Plain. Altavista sandy loam, the only type mapped, is developed from materials washed from soils in the Piedmont province and deposited by the streams when they flowed at higher levels.

Altavista sandy loam.—Most of this soil, which occupies a total of 192 acres, occurs in small areas north of Spring Villa State Park and to the northwest and southeast of Opelika. It is on a benchlike or second-bottom position having nearly level to slightly sloping relief, with a slope rarely more than 2 percent. Drainage is moderately good.

This sandy loam is similar in color to Kalmia sandy loam but has a much heavier and more compact subsoil and is developed from different materials. In cultivated areas it has the following profile:

0 to 5 inches, yellowish-gray loamy sand to light sandy loam.
5 to 15 inches, yellow friable sandy clay.
15 to 26 inches, yellow to light yellowish-brown fairly compact clay.
26 inches +, yellowish-gray firm sandy loam mottled with brown and gray.

Below this is yellowish-gray slightly compact sandy loam mottled with brown and gray. In places the subsoil is somewhat brown, whereas in others it is 1 or 2 inches of brown sandy loam recently deposited over the gray surface soil.

About 36 percent of this land is cleared and open, with about 50 percent of the cleared areas planted to corn. Small patches are occasionally planted to sugarcane for sirup. Corn and oats yield 8 to 20 bushels an acre where the crop is side-dressed with 50 to 150 pounds of nitrate of soda. These yields may be increased by the application of larger quantities of nitrate of soda. Cotton yields ¼ to ⅜ bale an acre when fertilized with 200 to 400 pounds of a 6–8–4[4] fertilizer or its equivalent.

APPLING SERIES

The soils of the Appling series occur in close association with the Cecil and Durham soils and on the undulating to rolling relief in the southern Piedmont province. These soils have a light-gray sandy surface soil, light yellowish-brown upper subsoil, and yellowish-brown to mottled yellow, brown, and gray lower subsoil. They are distinguished by the color of the subsoil, which is intermediate between the red Cecil and the yellow Durham subsoil. These soils have developed from the weathered products of light-colored granite and gneiss and have weathered or disintegrated to depths of 5 to 20 feet

[4] Percentages, respectively, of nitrogen, phosphoric acid, and potash.

or more. Both the subsoil and parent material contain a high content of potash. Appling sandy loam and its rolling phase are mapped.

Appling sandy loam.—A total of 2,880 acres of this soil is mapped on smoothly undulating ridges and low-lying slopes where the slope seldom exceeds 6 percent. While machinery can be used on these slopes, the size of the fields is often such that the use of tractors is impractical. The largest areas are located near Opelika, Union Chapel, Salem, and Bleecker. Drainage is sufficient for all crops.

This soil occurs in the Piedmont province part of the county and is intermediate in color between the Cecil and Durham soils. It has a gray surface soil and yellow to yellowish-brown subsoil mottled in the lower part. Following is a generalized profile description:

0 to 5 inches, light-gray mellow and friable sandy loam.
5 to 8 inches, yellowish-gray friable sandy loam.
8 to 16 inches, yellowish-brown moderately stiff clay to heavy fine sandy clay.
16 to 50 inches, mottled yellow, light-red, and brown stiff slightly compact clay.
50 inches +, disintegrated granite and gneiss rock.

Cotton, corn, oats, and hay crops are grown on 61 percent of the area. Peanuts may also be grown successfully. Even though this soil is used for these crops, it is not so extensively used for cotton as are the Cecil soils, because it warms a little slower in the spring and consequently suffers from heavy boll weevil infestation. Cotton yields normally are ¼ to ⅜ bale an acre under fair to good management, and corn, 8 to 30 bushels. Other crops make correspondingly good yields. The soil used for cotton is normally fertilized with 250 to 350 pounds of a 6–8–4 fertilizer or its equivalent, whereas corn either follows a winter cover crop or is fertilized with 100 to 200 pounds of nitrate of soda.

Small spots of Cecil and Durham soils are included with Appling sandy loam in mapping. Included with this soil also are some small areas of Herndon fine sandy loam, which are derived from slate and fine-grained schist rather than granite.

Appling sandy loam, rolling phase.—The rolling phase differs from Appling sandy loam in that it is steeper and more strongly sloping, has undergone more severe erosion, and has a smaller percentage suitable for cultivation. It occurs largely on slopes of 7 to 12 percent. The largest areas of the 832 acres mapped are in the vicinity of Opelika and Salem, with other areas scattered throughout the central part. It has the following profile characteristics:

0 to 4 inches, light-gray sandy loam to loamy sand with many galled spots exposed as the result of erosion.
4 to 18 inches, yellow compact heavy sandy clay.
18 to 40 inches, yellow to yellowish-brown compact sandy clay mottled and splotched with red and brown.
40 inches +, disintegrated granite and gneiss rocks.

At one time practically all of the soil was cleared, but at present all except about 33 percent has grown up chiefly to loblolly and shortleaf pines. That part under cultivation is cropped largely to cotton and yields ¼ to ½ bale an acre when fertilized with 150 to 300 pounds of a 6–8–4 or its equivalent. Yields of corn and oats are low. For the production of these crops large quantities of organic matter should

be turned under annually. The open areas are, in the main, best suited to a permanent cover crop, particularly kudzu or sericea lespedeza.

BIBB SERIES

The soil of the Bibb series occurs on low-lying positions in the first bottoms and is developed from materials washed from the acid soils of the uplands of the Coastal Plain. It has medium to light-gray surface soil and light-gray mottled with yellow or brown friable to moderately heavy subsoil. Associated with the Iuka soil, this naturally poorly drained series is subject to frequent overflowing. Bibb silt loam is the only type mapped.

Bibb silt loam.—Areas of this soil occur chiefly near the Macon County line along Chewacla Creek and near the Russell County line along Whites Creek. The total area mapped is 832 acres. The surface is nearly flat and is subject to overflow during high water; because of its position it is poorly drained. It lies back from stream channels bordering the uplands, with often an area of Iuka soil between it and the channel.

This light-gray soil of the Coastal Plains area is similar to the Myatt soil but is finer textured and occurs on lower lying positions. It is strongly acid in reaction. Following are profile characteristics of this type:

0 to 4 inches, medium to light-gray silt loam.
4 to 30 inches, light-gray mottled with yellow or brown silty clay loam.
30 inches +, medium-gray silt loam to silty clay loam containing a few brown mottlings.

None or very little of this soil is cleared, and it supports good stands of chiefly deciduous trees, mainly sweetgum, black tupelo, willow, water oak, yellow-poplar, elm, sycamore, and bay and some scattered shortleaf and loblolly pines. There is underbrush and ground cover of alder bushes, palmettos, vines, creepers, and canes. These areas are used for both summer and winter grazing.

If cleared this soil should provide fair pasture, but under present conditions the forest cover may be more valuable as a source of lumber and as game cover. If cleared for pasture, carpet grass would tend to crowd out the other more desirable grasses, especially Dallis grass. To improve this soil stream channels need deepening and straightening so as to lower the water table and eliminate part of the regular overflow. Small lateral ditches would carry the surplus rain water into the stream channels.

BRADLEY SERIES

The soils of the Bradley series, occurring in association with the Chesterfield soils, differ from that series in that the Bradley has red clay subsoil as contrasted with the yellow or light yellowish brown of the Chesterfield. The sandy surface layers have developed from sandy Coastal Plain material deposited over the clays developed from the weathered products of granite, gneiss, and schist. Bradley sandy loam and its sloping phase are mapped.

Bradley sandy loam.—This soil (2,560 acres) occurs in close association with the Chesterfield soils and along the border or fall line of the Piedmont province and Coastal Plain. The steepest slopes are less

than 7 percent, and the surface varies from smooth and regular to undulating and gently sloping. All areas are naturally well drained. The soil is subject to erosion, and terracing is usually needed on the more sloping areas to prevent too rapid runoff.

The surface soil is dominantly sandy and similar to the surface soil of Norfolk sandy loam, whereas the subsoil is similar to that of the Cecil of the Piedmont province. The following profile indicates the approximate depth and thickness of each layer:

0 to 5 inches, brownish-gray sandy loam.
5 to 10 inches, light yellowish-brown mellow and friable sandy loam.
10 to 40 inches, red or yellowish-red stiff but brittle clay or smooth silty clay.
40 inches +, grades into disintegrated granite, gneiss, or slate rock.

In some cases the surface soil has a spotted gray, brown, and red general appearance resulting from erosion. In the uneroded condition it is brownish gray to grayish brown. Both angular and rounded quartz gravel are scattered over the surface in small numbers, but as a rule in insufficient quantity to handicap cultivation. In places the upper 18 to 24 inches resembles the Ruston soil.

About 64 percent of this soil is open land; the rest is in forest and woodland pasture. The usual crops grown are cotton, corn, soybeans, oats, cowpeas, and garden vegetables; yields produced are about the same as on Cecil sandy loam, eroded phase. Cotton yields of ¼ to ⅜ bale an acre are normally obtained when the land is fertilized with 250 to 400 pounds of a 6–8–4 mixture, and corn produces 8 to 25 bushels when 100 to 225 pounds of nitrate of soda are applied. Shortleaf, loblolly, and longleaf pines together with sweetgum and various species of oak grow in forested areas.

A few small spots of Ruston soil are included as this type, but generally below 2 feet the soil is a heavy compact red clay.

Bradley sandy loam, sloping phase.—This phase is similar to Cecil sandy loam, eroded rolling phase, but differs largely in that the Bradley has some water-worn gravel and rounded sand particles in and on the surface. This soil occurs as relatively small scattered areas in the southern part of the county. The largest are near the intersection of Little Uchee and Peters Creeks and north and west of Loachapoka. A total of 2,496 acres is mapped, 24 percent of which is open for cultivation.

The soil has the same utilization, management problems, fertilizer and cropping requirements, and erosional problems as Cecil sandy loam, eroded rolling phase.

CECIL SERIES

The soils of the Cecil series are the most widely distributed soils in the southern Piedmont province and are associated with the Appling, Durham, and Madison soils. The Cecil soils have a brownish-gray or reddish-brown sandy surface soil and a moderately red heavy stiff brittle clay subsoil. They are developed from the weathered products of granite, gneiss, and mica schist; in places these rocks have weathered or disintegrated to depths of 6 to 60 feet or more. The surface relief ranges from undulating or gently rolling on the broader stream divides to steeply sloping, hilly, and broken in areas bordering the stream valleys. Drainage is good to excessive, and both sheet and gully erosion are severe on the more sloping and hilly areas that have been in

clean cultivation for several years. The surface soil and subsoil are strongly to very strongly acid in reaction. A high percentage of potash is in the subsoil and the underlying weathered material. Cecil clay loam and its hilly and rolling phases and Cecil sandy loam, with its eroded and eroded rolling phases, are mapped.

Cecil clay loam.—Locally known as "red clay land", this soil is largely an eroded condition of Cecil sandy loam. The relief is gently undulating or smoothly sloping with the steepest slopes seldom exceeding 6 percent. Drainage is good to excessive so that well constructed and carefully laid out terraces are necessary to prevent erosion, retard runoff, and conserve moisture. The areas are scattered over the northern half of the county, particularly in the vicinities of Stonewall, Mount Olive Church, and Blanton. A total of 6,464 acres is mapped.

The grayish-brown sandy surface soil has been removed by erosion and the present surface soil was once the subsoil with an admixture of the sandy surface soil. The soil has the following profile characteristics:

0 to 5 inches, light-red to reddish-brown clay loam containing some sand in the upper 2 or 3 inches.
5 to 40 inches, stiff brittle slightly compact heavy red clay. Under normal conditions it can be crushed into a coarse granular mass. This clay is very hard when dry but sticky and slick when wet.
40 inches +, grades into disintegrated and decomposed granite and granite rock.

Some areas have sufficient rock fragments, varying from ½ to 3 inches in diameter, to interfere somewhat with tillage operations. These gravel are shown on the map by symbols.

About 58 percent of the soil is cropped to cotton, corn, soybeans, and oats. Cotton yields ¼ to ⅜ bale an acre, corn 8 to 25 bushels, oats 10 to 35 bushels, and soybeans ½ to 1 ton of hay. These yields are obtained where the soil receives 300 to 400 pounds an acre of a 3–8–5, 4–8–4, or 6–8–4 mixture, while corn and oats receive side or top dressing of 75 to 200 pounds of nitrate of soda. Fair to good yields of lespedeza and peanuts are also obtained under good management.

The soil is better adapted to winter and spring crops and cotton than to corn. Oats, wheat, and winter legumes (Austrian peas, crimson clover, or vetch) should be worked in rotations so as to keep the surface covered during winter and spring. Deep plowing, mulching the surface soon after plowing, and incorporating large quantities of organic matter greatly help to retain moisture for summer crops. The soil is also well suited to lespedeza, kudzu, Dallis grass, white Dutch clover, and hop clover, rating among the best in the county for pasture purposes when the areas have been properly seeded and fertilized.

Included on the map are a few small areas of Cecil sandy loam and its eroded phase that are too small for separation.

Cecil clay loam, hilly phase.—This hilly phase is an eroded soil that occurs on steep slopes. A total of 27,328 acres is mapped, with especially large bodies along the Chattahoochee River and along Sougahatchee and Halawakee Creeks. The relief is steep, broken, and hilly with most of the slopes ranging from 12 to 40 percent.

Both the top soil and the clay subsoil are dominantly red. The surface consists of 3 to 5 inches of red to brownish-red finely granular clay loam. The subsoil is red heavy moderately compact clay that

grades into soft weathered granite and quartz materials at a depth of 25 to 40 inches. In many places on the surface are angular quartz and granite rock fragments, varying from 1 to 12 inches in diameter. Occasionally small rock outcrops occur.

Some small areas where the slopes are not so severe are farmed. Cotton yields ⅛ to ½ bale an acre when fertilized with 300 to 400 pounds of a 6–8–4 fertilizer or its equivalent; corn 5 to 15 bushels when grown in rotation with cotton and side-dressed with 50 to 100 pounds of nitrate of soda.

About 98 percent of the total area of this soil is in woodland. Shortleaf and loblolly pines are the dominant tree growth, with various species of oak scattered throughout. The lower slopes often support numerous other trees, mainly oak, hickory, sweetgum, and black tupelo. The best use for this hilly phase is trees or kudzu. The more hilly areas where timber has been removed are best suited to kudzu for temporary pasture. Areas still cultivated were terraced soon after being cleared with ridge-type terraces often built with stone and rocks. The interterrace spaces are usually 30 to 50 feet wide and have a slope of 7 percent or less, while the downhill side of the terrace drops abruptly 3 to 5 feet to the next interterrace spaces below. Most of this soil is severely gullied even though old terraces are still in evidence in the forested areas.

In the eastern part of the county some areas of Davidson clay loam, steep phase, are included with this classification.

Cecil clay loam, rolling phase.—Areas of this soil are scattered over a large part of the northern two-thirds of the county, with the largest areas in the vicinities of Opelika and Salem and in the extreme northeastern part. A total of 12,288 acres is mapped. This phase differs from Cecil clay loam in that it occurs on a more rolling relief and has consequently become more eroded. Much of it was at one time a sandy loam, but erosion has removed most of the sandy material. The 4- to 6-inch surface layer is reddish-brown friable clay loam over a firm compact red clay subsoil. Disintegrated quartz and granite rock are present at depths of 3 or 4 feet.

Most of this phase (76 percent) is in forest, principally shortleaf, loblolly, and longleaf pines, and various species of oak, poplar, and other hardwoods. General farm crops are grown in the open areas, or the remaining 24 percent. Cotton yields ¼ to ½ bale an acre when fertilized with 200 to 350 pounds of a 6–8–4 fertilizer or its equivalent; corn and oats 8 to 25 bushels when fertilized with 100 to 200 pounds of nitrate of soda; and hay crops, which are seldom fertilized, ½ to 1 ton. Only the more gently sloping areas should be farmed to clean-tilled crops, and the more sloping to rolling areas should be planted to kudzu or sericea lespedeza for pasture or hay crops.

Included with this soil are about 1,500 acres of Georgeville silty clay loam, rolling phase. These areas are located north and northeast of Salem and northwest of Bleecker and present the same problems with regard to erosion, management, utilization, and fertilization as does this soil. The Georgeville soils are derived from slate and slatelike rock, while Cecil soils are largely from granite.

Cecil sandy loam.—Agriculturally this is one of the most important soils of the Piedmont province. It occurs on rather smooth ridge-

top or interstream areas where the relief varies from slightly undulating to gently sloping. The greatest slopes do not exceed 7 percent and all types of farming machinery can be readily used. Both external and internal drainage are good, and while terracing is usually advantageous, erosion is not particularly severe.

The most important and extensive areas are in the vicinities of Roxana, Ridge Grove School, Opelika, 1 mile south of Spring Villa State Park, and near U. S. Highway No. 29 where it leaves the county. Gravelly areas are shown on the map by gravel symbols. A total area of 9,792 acres is mapped. This type has the following profile characteristics:

0 to 6 inches, gray to brownish-gray sandy loam.
6 to 9 inches, yellowish-brown sandy loam to light sandy clay.
9 to 50 inches, reddish-brown or red heavy stiff and moderately compact but brittle clay, the lower part becoming friable.
50 inches +, brown and gray soft disintegrated granite rock material.

About 62 percent of this soil area is open for cultivation (pl. 1, *A*). Cotton produces more than 1 bale an acre when the land is fertilized with 500 to 600 pounds of a 6–8–4 fertilizer, and corn produces 35 bushels when 200 to 225 pounds of nitrate of soda are applied to the land 35 to 40 days after planting. Corn should be in rotation with cotton. Turning under a green-manure crop, as vetch, crimson clover, or Austrian peas, preceding the corn crop is the most profitable means of fertilization. Lime would be beneficial as both the soil and subsoil are strongly acid. Normally cotton yields ½ to ¾ bale an acre, and corn 15 to 25 bushels; but only 200 to 300 pounds of a 6–8–4 fertilizer or its equivalent are used for the cotton, and 75 to 150 pounds of nitrate of soda for the corn. Soybeans, sorghum, cowpeas, and oats are also well suited to this soil. Under similar management oats yield about the same as corn. Under good management 1 to 1½ tons of soybean hay are produced.

Occasional spots of Cecil clay loam less than 1 acre in size are included in mapping and also occasional small spots of Appling sandy loam.

Cecil sandy loam, eroded phase.—This extensive soil consists of areas of Cecil sandy loam and Cecil clay loam intermixed with such complexity in small irregular-shaped areas that it is not feasible to attempt to separate them on the scale of mapping. The relief is generally smoothly sloping and undulating with the steepest slopes seldom exceeding 6 percent. All types of machinery can be readily used if the area is not too small and irregular in shape; however, terracing is necessary, and contour cultivation makes power farming somewhat difficult. Drainage is sufficient for all crops, though due to the heavy character of the subsoil it is inadvisable to plow or cultivate this land when the moisture content is high. Areas are scattered throughout the northern part of the county, particularly in the vicinities of Opelika, Union Chapel, Wallace Chapel, and Salem. A total of 45,312 acres is mapped.

The entire surface was originally gray sandy loam, but sheet erosion has removed so much of the surface that the present conditions result. Plowed fields present a spotted appearance of gray, brown, and red. The sandy loam surface varies from 3 to 6 inches in depth, and in

most places brown to brownish-red clay to sandy clay is encountered at 6 or 7 inches. The areas lacking a sandy surface have a red to reddish-brown clay loam to clay plow soil breaking abruptly into heavy moderately compact red clay. The subsoil and substratum is like that of the typical soil. As a rule the subsoil extends downward to a depth of 4 or 5 feet or more, but occasional shallow spots are included where soft disintegrated granite or mica schist is within 18 inches of the surface.

About 62 percent of this soil is open for cultivation. Cotton, the principal crop, normally yields ⅛ to ⅜ bale an acre where the land is fertilized with 250 to 350 pounds of a 6–8–4 fertilizer or its equivalent. Oats yield 15 to 35 bushels and corn 10 to 25 bushels when each is fertilized with 100 to 200 pounds of nitrate of soda. The use of winter crops is desirable for soil improvement and erosion control; best crop yields are obtained by farmers following this practice. Other crops, as kudzu, sericea lespedeza, soybeans, and cowpeas, may be grown satisfactorily.

Areas of Madison sandy loam too small to separate are included. In many places angular quartz fragments are numerous on the surface and interfere to a certain extent with cultivation.

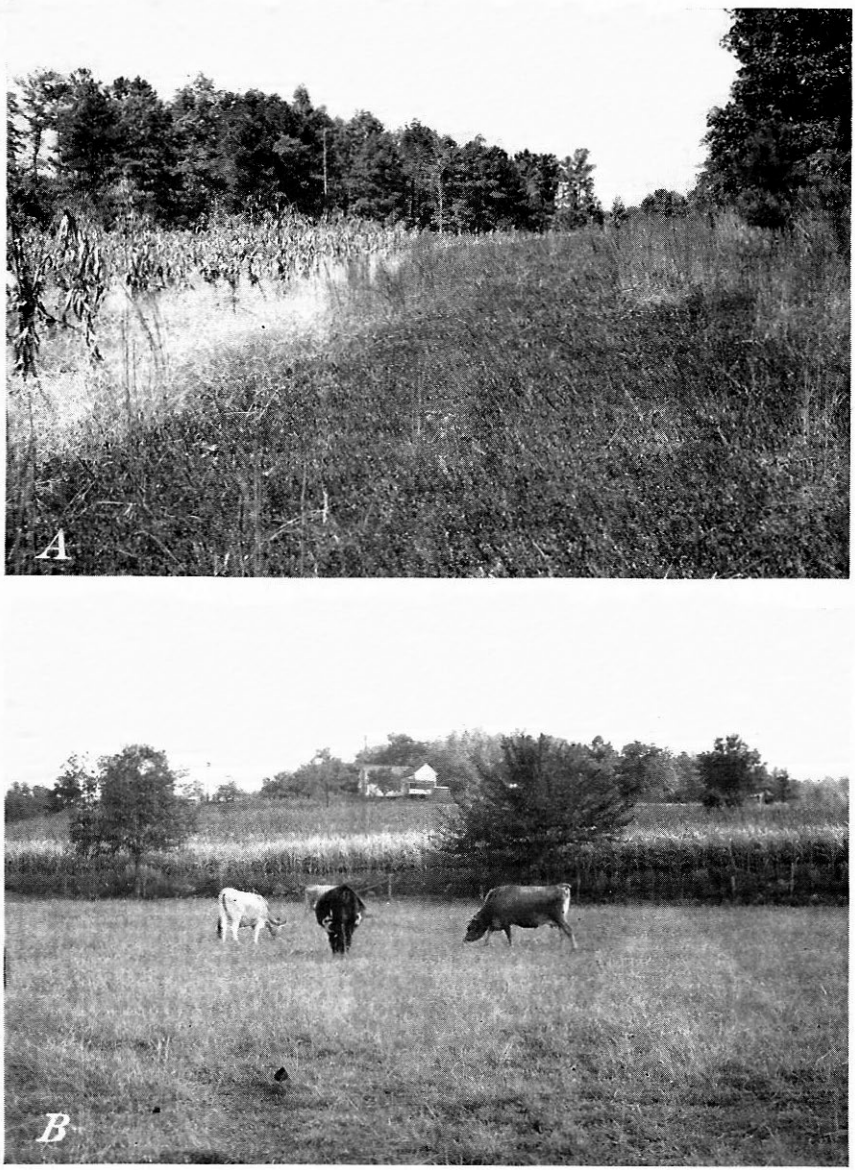
Cecil sandy loam, eroded rolling phase.—Occurring chiefly on slopes toward streams and around drainage heads in irregular-shaped areas, this soil has slopes of 7 to 12 percent. Drainage is good to excescessive. Erosion is very severe on all clean-tilled areas unless they are very carefully terraced or kept in close-growing crops. In many instances strip crops may be advantageously used, whereas in many other locations the areas should be retired to permanent cover. The areas are scattered over the northern two-thirds of the county. A total of 46,336 acres is mapped.

This phase consists of an intricate association and mixture of Cecil sandy loam and Cecil clay loam. The sandy loam areas have 3 to 6 inches of gray sandy loam overlying a red clay subsoil, whereas the areas of clay loam have a brown to reddish-brown clay loam plow soil 3 to 5 inches thick over heavy red clay. As a rule each condition comprises one-half to three-fourths of the area, but it may vary so that sometimes 70 percent of the surface is clay loam, whereas in other places 70 percent is sandy loam. At a depth of 3 to 5 feet heavy red clay grades into soft disintegrated granite rock.

About 24 percent of the area of this phase is open for cultivation. Formerly much more of this soil was cultivated but it has now reverted to trees because of erosion and excessive cost of cultivation. When properly terraced the more gently sloping areas can be used economically for crops, and the more sloping areas that are not in trees should be used for kudzu (pl. 1, *B*) or sericea lespedeza.

Crop yields are slightly lower than on Cecil sandy loam, eroded phase. Cotton yields ⅛ to ½ bale an acre when fertilized with 200 to 250 pounds of 6–8–4 fertilizer or its equivalent, and corn and oats yield 6 to 20 bushels when fertilized with 100 to 200 pounds of nitrate of soda. As this soil is very subject to erosion when used for clean-cultivated crops, and as many areas are adjacent to narrow strips of bottom lands, it may be used advantageously for pasture purposes. It is well suited to Dallis grass, orchard grass, white Dutch clover,

A, Alfalfa growing on Cecil sandy loam. *B*, Kudzu growing on Cecil sandy loam, eroded rolling phase. Kudzu on left covers face of old bench terrace. (Soil Conservation Service photograph.)



A, Sericea lespedeza on Chesterfield sandy loam on the right; corn on Norfolk sandy loam to the left. *B*, Pasture and sugarcane on Congaree silt loam in foreground; corn on Cecil sandy loam in background. (Soil Conservation Service photographs.)

kudzu, and sericea lespedeza. The use of 500 to 1,000 pounds of basic slag an acre is beneficial for pasture grasses.

Some small areas of the eroded rolling phases of Madison sandy loam, Louisa clay loam, Bradley sandy loam, and Georgeville silty clay loam are included. These soils are similar to Cecil sandy loam, eroded rolling phase, in characteristics that determine their suitability for use.

CHESTERFIELD SERIES

The soils of the Chesterfield series have a light-gray or yellowish-gray sandy surface soil and a yellow or light yellowish-brown rather heavy stiff clay subsoil, with some light-red mottles in the lower layer. The subsoil is developed from weathered products of granite, gneiss, and mica schist of the Piedmont province, whereas the surface soil is variable in depth and developed from sandy deposits of the Coastal Plain over these clays. These soils range in relief from undulating to rolling and are well drained. They are medium to strongly acid in reaction. Chesterfield sandy loam and its deep and sloping phases are mapped.

Chesterfield sandy loam.—This soil lies along the border line of the Piedmont province and Coastal Plain where sandy materials of the Coastal Plain overlie residual clays developed from granite, gneiss, and schist.

Occurring generally in gently undulating or rolling areas, the slopes seldom exceed 7 percent and are more generally from 2 to 5 percent. Despite this fact, however, the areas are badly divided into ill-shaped fields when terraced because the slopes are complexities of slopes and not slopes in a single direction. This makes farming on some fields with large machinery difficult. Natural surface drainage is good.

Areas of this soil are in the western part of the county near the Macon, Tallapoosa, and Lee County lines and extend eastward through Auburn, about 1 mile north of Beauregard School, 1 mile south of Bleecker, slightly south of Smiths Station, and to the Chattahoochee River at the Russell-Lee County line in an irregular and broken chain. A total of 14,208 acres is mapped, 69 percent of which is open for cultivation; the rest is forested to loblolly and longleaf pines and oak. This type has the following profile characteristics:

0 to 7 inches, light-gray loamy sand or light sandy loam with the surface completely eroded away in many places.
7 to 20 inches, yellow or light yellowish-brown stiff but smooth clay to silty clay.
20 to 50 inches, heavy compact yellow clay streaked with brown, yellow, and gray.
50 inches +, decomposed granite and gneiss rock.

Usually there is a mixture of rounded and angular quartz gravel and rock fragments scattered over the surface and through the plow soil. The rounded gravel is ¼ to 2 inches in diameter, whereas the angular rocks vary from about 2 inches on a side to 6 or 8 inches. Considerable evidence of rounded Coastal Plain sand and gravel is present in the upper 18 to 24 inches, and the clay below that depth shows increasingly more Piedmont rock evidence. Included with this type are small spots of less than an acre where there are 1 or 2 inches of sandy material over heavy yellow clay if erosion has been

unchecked. The sandy surface layer is 5 to 15 inches thick over the greater part of the type.

In many places this soil has a shallow surface soil over a tight, compact, and firm subsoil that causes it to be very erodible and droughty. It is, therefore, best suited to crops that grow in spring or to cotton that has a relatively strong feeding-root system. Cotton yields of ¼ to ½ bale an acre are normally obtained when the land is fertilized with 200 to 400 pounds of 6–8–4 fertilizer or its equivalent. The least eroded spots are selected for corn, and yields of 5 to 20 bushels are obtained when 100 to 225 pounds of nitrate of soda are applied. Oats yield 10 to 25 bushels when fertilized with 100 to 150 pounds of nitrate of soda. Winter cover crops are used advantageously as a means of checking erosion and at the same time build up the organic matter and moisture-holding capacity (pl. 2, *A*).

Many small spots are included where fairly good profiles of Norfolk sandy loam, occasional spots of Chesterfield fine sandy loam, and small indeterminate areas of Bradley sandy loam are included.

Chesterfield sandy loam, deep phase.—This soil can be farmed with a minimum of effort, as it occurs on almost level to gently sloping areas. Power machinery can be used satisfactorily on most areas Agriculturally, it is similar to Norfolk sandy loam. It is well suited to all locally grown crops, responds exceptionally well to good management, is easily tilled, and is very productive when liberally and properly fertilized. All this soil is well drained and warms early in spring. The largest areas are between Auburn and Loachapoka, south of Auburn, on the east edge of Johnsons Lake, 2 miles northeast of Meadows Crossroads and 1 mile south of Smiths Station. A total of 3,776 acres is mapped, 87 percent of which is open for cultivation.

This phase represents a soil intermediate between Norfolk sandy loam and Chesterfield sandy loam. The surface soil and upper subsoil are similar to those of the Norfolk, while the lower subsoil and parent material are heavy in character like the Chesterfield. This soil has the following profile characteristics:

0 to 6 inches, yellowish-gray to light brownish-gray loamy sand.
6 to 18 inches, yellow loose friable sandy clay.
18 to 50 inches, yellow to light yellowish-brown stiff compact firm smooth clay.
50 inches +, disintegrated granite and gneiss rocks.

Yields, management requirements, and crop adaptations are essentially the same as for Norfolk sandy loam. Normal yields of ½ to more than 1 bale of cotton an acre are generally obtained where the land is fertilized with 300 to 600 pounds of a 6–8–4 fertilizer; corn yields 15 to 35 bushels when rotated with cotton and when fertilized with 200 to 225 pounds of nitrate of soda or when following a good winter cover crop; oats yield about the same as corn when fertilized the same as corn; hay crops are also well suited.

Small areas of Chesterfield sandy loam and Norfolk sandy loam that are too small to delineate on the map are included.

Chesterfield sandy loam, sloping phase.—Most of this phase occurs on slopes of 7 to 12 percent toward streams and around short drawheads projecting back into surrounding areas. The soil is subject to severe sheet and gully erosion. Erosion is very destructive, and

terracing must be resorted to if the soil is to be used for tilled crops. On the other hand, the areas are so ill-shaped that when terraced, small irregular-shaped fields are formed—this means that small farm machinery must be used. The largest areas are near Phenix City, 3 miles southeast of Bleecker, 2 miles north of Meadows Crossroads, north of Davis Lake, and in the vicinity of Auburn. A total of 15,488 acres is mapped.

This phase has a shallow sandy surface soil over a hard compact yellow clay subsoil. The depth of the surface soil varies owing to different degrees of erosion, but in the main it has the following profile characteristics:

0 to 5 inches, gray loamy sand.
5 to 36 inches, yellow firm compact clay containing some brown mottlings.
36 inches +, decomposed soft granite and gneiss rocks.

Because of the nearness of the heavy compact subsoil to the surface this soil is droughty for crops; consequently, a large part of it that had been cultivated at one time is reverting to forest. Only 15 percent is now cleared, and only a part of this is used for crops. Crop yields are low, and farming these areas is a problem. A few small select areas where erosion has been controlled may be used economically for crops. In general this soil is best suited to kudzu or woodland; the latter is possibly the best use, as kudzu is difficult to establish. About 85 percent is principally in pine and scrub oak.

CHEWACLA SERIES

The soil of the Chewacla series, occurring in the first bottoms, is formed from materials washed from soils in the Piedmont province and deposited by the streams. It has a brown friable surface soil and a mottled light-gray and brown friable subsoil. The color of the surface soil indicates fair to good drainage, but the mottled character of the subsoil indicates very poor drainage. Both surface soil and subsoil are medium to strongly acid in reaction. Only one type—Chewacla silt loam—is mapped.

Chewacla silt loam.—Although closely associated with the Congaree soils, this soil differs from them principally in being less well drained. It is developed from alluvial material of the Piedmont province. Areas are along the Chattahoochee River, where they occur as low spots bordering the uplands, along Chewacla, Sougahatchee, and Halawakee Creeks, and around Pepperell. A total of 3,264 acres is mapped.

The surface is nearly flat, and, except for being liable to frequent overflows, the soil has fair to imperfect drainage. The water table is high, but if overflows could be prevented corn and hay could be grown successfully. Because of different degrees of drainage this profile is somewhat variable, but in the main it has the following characteristics:

0 to 10 inches, brown to dark-brown granular friable silt loam.
10 to 18 inches, brownish-gray friable silt loam finely mottled with gray.
18 inches +, light-gray friable silt loam mottled with brown and yellow.

About 21 percent of this soil has been cleared, mostly for pasture. Corn is planted along some of the smaller streams and produces fair

to large yields when not damaged by overflow. The cleared areas produce excellent pasture grasses, as Dallis grass, white Dutch clover, Persian clover, and lespedeza. The wooded areas support dense stands of pine and deciduous trees. The dominant trees are loblolly and shortleaf pines, yellow-poplar, red gum, willow, hickory, beech, black tupelo, swamp oak, bay trees, and other trees and shrubs. Practically all areas can be developed into excellent pasture by clearing and seeding to a proper grass mixture. The use of 500 to 1,000 pounds an acre or more of basic slag, or the equivalent in lime and phosphate, is practiced by some farmers on pasture grasses with excellent results.

Small areas of Congaree silt loam too small to delineate are included on the map.

CONGAREE SERIES

The soils of the Congaree series are brown, friable, and well drained, occurring in the first bottoms along the streams of the Piedmont province. They are better drained than the Chewacla soils with which they are associated. The parent material has been washed from the Cecil, Appling, Madison, Davidson, and other soils of the uplands in the Piedmont province and deposited by streams. New materials are deposited at each overflow. Some scales of mica are noticeable throughout the soil and subsoil. The reaction is medium to strongly acid. Congaree silt loam and Congaree sandy loam are mapped.

Congaree sandy loam.—A total of 896 acres of this soil is mapped in close association with Congaree silt loam. The largest areas are along the Chattahoochee River and Sougahatchee, Moores Mill, and Little Uchee Creeks. Other areas are near Blanton and Goat Rock Dam.

This type differs from Congaree silt loam in the sandy texture of both soil and subsoil and in that it generally occupies slightly higher positions and is better drained. It has the following profile characteristics:

0 to 8 inches, brown loamy sand to sandy loam.
8 to 36 inches, light yellowish-brown friable sandy loam to sandy clay.
36 inches +, dark grayish-brown sandy loam to silt loam mottled with yellow and gray.

Even though only 43 percent of the soil is in cultivation, practically all of it can be used successfully for crops or pasture. It is an excellent soil where not subject to frequent overflows. Corn, the principal crop, yields 15 to 35 bushels an acre without fertilization; some farmers, however, fertilize with nitrate of soda, since it is economical for the production of corn or oats. The soil warms early in spring and would produce a wide variety of garden vegetables, the only danger being overflow. It responds readily to the addition of barnyard manure or to commercial fertilizers. Watermelons do well. The areas most subject to overflow make excellent pastures when cleared and planted to Dallis grass, white Dutch clover, Persian clover, hop clover, and lespedeza. Persian clover and Dallis grass are especially desirable on the areas most subject to overflow, as they withstand 4 or 5 days of overflow without destruction. The tree growth consists principally of pine, oak, gum, beech, hickory, maple, and elm.

Small areas of Congaree silt loam too small to show separately are included in the map.

Congaree silt loam.—Developed on the first bottoms of the Piedmont province, this soil is somewhat variable in character. The largest and most extensive areas are along the Chattahoochee River and the following creeks: Sougahatchee, Chewacla, Halawakee, Little Uchee, Phelps, Sturkie, and Wacoochee. The best developed areas are south of Goat Rock Dam along the Chattahoochee River. A total of 6,400 acres is mapped. Occurring on a nearly flat surface with a slight gradient in direction of stream flow, this soil is well enough drained for growing corn and hay. The greatest hazard to crop production is its susceptibility to overflow. In the main it has the following profile characteristics:

0 to 15 inches, brown mellow silt loam.
15 to 30 inches, yellowish-brown to grayish-brown mellow silt loam.
30 inches +, mottled brownish-yellow and gray silty or sandy material.

Finely divided mica flakes are present throughout the profile. In a few places dark-colored layers are present a few inches below the surface and in others the subsoil is firm and somewhat heavier than typical of the type. These characteristics have little influence on crop production. In addition, a few small areas of poorly drained soils too small to separate are included on the map.

About 20 percent of this soil is in cultivation or in pasture. It is one of the best soils in the county for corn; yields of 20 to 50 bushels an acre are normally produced without fertilization. It is also especially well suited to the growth of sorghum for ensilage purposes. Hay crops, particularly Johnson grass, are also grown satisfactorily.

This soil, irrespective of location, can be developed into excellent pasture land (pl. 2, *B*), as it is well suited to Dallis grass, lespedeza, white Dutch clover, carpet grass, and hop clover. Persian clover and Dallis grass are especially desirable for those areas most subject to overflow, as these crops withstand overflows of 4 or 5 days duration without serious injury unless silted or sanded. The use of 300 to 600 pounds an acre of basic slag or the equivalent of lime and phosphate is used by some farmers with excellent results, but in general farmers do not use fertilizer on the land regardless of the crop grown. Most of the tree growth is gum, maple, elm, oak of various species, hickory, beech, ironwood, and alder.

Small areas of Ochlockonee silt loam are included with this soil. Except for source of material they are almost identical. Such areas are along Little Uchee and Chewacla Creeks. About 10 percent of the inclusion is planted to corn and the rest is in timber.

DAVIDSON SERIES

The soils of the Davidson series are dark brown to dark reddish brown in the surface layer and dark red to dark reddish brown in the heavy smooth stiff clay subsoil. They are associated geographically and in origin with the Iredell and Lloyd soils, but the material has undergone a more advanced stage of aeration, oxidation, and decomposition, and in many places solid rocks are several feet below the surface. These soils have developed from the weathered products of

dark-colored basic rocks. The relief ranges from undulating to rolling, and the natural surface drainage is good. Erosion is active, particularly on the more sloping areas under clean cultivation. These soils differ from the Cecil in having a darker red color, a higher content of lime, and a lower content of potash. The surface soil and the subsoil are slightly to medium acid. Davidson clay loam and its rolling phase are mapped.

Davidson clay loam.—Although this is one of the most fertile upland soils of the area, it is also one of the most difficult to work and manage. It occurs on a relief of 3 to 6 percent and is well to excessively drained. Water also penetrates the subsoil rather slowly, causing the soil to be very erodible. Terracing is badly needed; where this has not already been done and on some of the more sharply breaking slopes, perennial hay crops (kudzu or lespedeza) should be grown. The use of strip crops may be practical in many locations. Both soil and subsoil are medium acid as contrasted with the strongly acid Cecil clay loam. The greatest acreage occurs in the northwestern part of the county, but other areas are in the vicinities of Shotwell and Bleecker. A total of 8,832 acres is mapped. The soil has the following profile characteristics:

0 to 5 inches, dark-brown to dark reddish-brown finely granular clay loam.
5 to 40 inches, dark-red to dark reddish-brown, maroon-colored, heavy, rather stiff, brittle, and smooth clay that crumbles under light pressure into a granular mass and blocky structure.
40 to 70 inches, light-red or ocherous-yellow and compact clay.
70 inches +, yellowish-red and ocherous-yellow soft decomposed hornblende schist or diorite rock.

Very little grit or sand is contained in the profile. Some included areas as mapped lack the fine loose granular structure of the upper part of this profile and have a hard and compact heavy clay subsoil. This is especially true of areas north of Bleecker.

This soil is well suited to practically all locally grown crops. About 86 percent of it is open for cultivation, and the rest is forested largely to oldfield pine. For pasture, hay, and small grain it is the best upland soil of the Piedmont province, being well suited to Dallis grass, white Dutch clover, hop clover, lespedeza, and possibly Kentucky bluegrass and alfalfa. Cotton, corn, oats, peanuts, sorghum, and other crops make good to excellent yields under good management. Cotton yields ⅓ to ½ bale an acre when fertilized with 200 to 300 pounds of a 6–8–4 mixture; corn and oats 10 to 40 bushels when top-dressed with 100 to 200 pounds of nitrate of soda. This soil can be built up to a high state of productivity by the use of green manure and barnyard manure and some commercial fertilizer.

Davidson clay loam, rolling phase.—This phase occurs on a rolling to hilly relief of 7 to 12 percent gradient, and under clean cultivation it is subject to severe sheet and gully erosion. The more gentle slopes may be used economically for clean-cultivated crops, as cotton and corn, provided the areas are carefully terraced and the terraces maintained. The relief is similar to that of Cecil clay loam, rolling phase, but this phase is darker colored and contains more calcium and magnesium. It differs from Davidson clay loam in that it is more rolling and more severely eroded.

The largest areas are in the northern part of the county, principally northwest of Rowells Crossroads, and in the vicinities of Gold Hill Post Office, Mount Jefferson, and Bleecker. A total of 4,544 acres is mapped.

The surface soil is a dull-red friable clay loam, and the subsoil is a maroon-red heavy stiff brittle smooth clay, underlain by disintegrated hornblende schist and diorite rocks at a depth of 4 to 6 feet.

In general power machinery is not used on this phase. A disk plow is most satisfactory for breaking the land because the soil scours off the plow with difficulty. This soil should be plowed when moisture conditions are ideal, as it is sticky when wet and tends to become hard if too dry.

The wooded areas, constituting about 67 percent of the total acreage, are used for range land pasture and forest. The principal tree growth is shortleaf, loblolly, and longleaf pines, various species of oak, and yellow-poplar. Only 35 percent of this soil is in cultivation or open for cultivation, many areas having reverted to trees about the time the boll weevil invaded the area. The open areas, especially the steeper ones, are probably best suited to livestock. The soil is well suited to lespedeza, Dallis grass, orchard grass, hop clover, and possibly white Dutch clover and Kentucky bluegrass, if fertilized annually with 500 to 1,000 pounds an acre of basic slag or its equivalent. It is also well suited to kudzu, which may be used for temporary pasture or harvested for hay.

DURHAM SERIES

The soil of the Durham series occurs in close association with the Cecil and Appling soils and is developed from the weathered products of light-colored granite and gneiss. It is the lightest colored soil in this part of the Piedmont province and has a light-gray to yellowish-gray surface soil and yellow to light brownish-yellow moderately friable clay subsoil, which becomes mottled with light red at a depth of 28 to 32 inches. The relief is undulating to gently sloping, and the soil is naturally well drained. Durham sandy loam, the only type mapped, is strongly acid in reaction.

Durham sandy loam.—This soil occurs in the Piedmont province and in relief, drainage, and profile closely resembles Norfolk sandy loam of the Coastal Plain. It is generally found on low ridge tops or near the base of slopes where there is a slight gradual descent to streams; on the other hand, the area occupied on the north side of Butler Creek is somewhat dissected by short streams that flow into the creek. A total of 1,280 acres is mapped, with most of the areas near Opelika and Salem. In cultivated areas this soil has the following profile characteristics:

0 to 6 inches, light-gray to yellowish-gray loamy sand to light-textured sandy loam.
6 to 12 inches, light-yellow sandy loam.
12 to 26 inches, light yellowish-brown or yellow friable clay or heavy sandy clay.
26 to 40 inches, yellow sandy clay or clay mottled with some red and brownish red in the lower part.
40 inches +, yellow and light-gray hard compact clay strongly mottled with red or brownish red grading into disintegrated granite rock streaked with yellow, red, and brown.

This is good agricultural soil, being easy to till and responsive to management. It is not susceptible to serious erosion when terraced and properly managed and is well suited to all locally grown crops. Of the 51 percent of the soil in cultivation, the acreage is about equally divided between cotton and corn; the rest is forested to shortleaf, loblolly, and longleaf pines and a variety of oak and other deciduous trees. Cotton yields ⅛ to ¾ bale an acre when the soil is fertilized with 250 to 300 pounds of 6–8–4 fertilizer or its equivalent; corn 20 to 35 bushels when following a cover crop or when fertilized with about 150 pounds of nitrate of soda as a side dressing. Other crops, as oats, sorghum, soybeans, sugarcane, sweetpotatoes, and garden vegetables, also yield well on this soil.

Included in mapping are small areas of Appling sandy loam. Some areas have had the surface layers removed for road-building material, as much of this soil has about the correct proportions of sand and clay for good road subgrade construction.

EDGEMONT SERIES

The soils of the Edgemont series occur on ridges, knolls, and steep sides of the so-called mountains. They are well to excessively drained, and erosion is active on clean, cultivated areas. The soils are gray or yellowish gray in the surface layer, and the subsoil is yellow or yellowish-brown friable clay or heavy fine sandy clay, which in places becomes a light red below a depth of 24 to 30 inches. They are derived from quartzite, quartz schist, and conglomerates and are very stony in character. Outcrops of bedrock occur locally, and in many other places the rock is near the surface. The soils are strongly acid in reaction. Edgemont stony loam and its steep phase are mapped.

Edgemont stony loam.—This soil constitutes some of the most stony parts of the county. Many angular stones and gravel, chiefly quartzite, are scattered over the surface and in sufficient abundance to interfere with cultivation. The largest and most extensive areas occur 3 to 8 miles east of Opelika, in the vicinity of Spring Villa State Park, and 3 miles northwest of Salem. A total of 3,072 acres is mapped. The gray sandy surface soil rests on a yellow to yellowish-brown heavy sandy clay subsoil.

This soil occurs on a sloping to hilly relief, and this, together with the severe stoniness, determines its present land use. About 94 percent of it is used for timber and should be kept in trees, principally shortleaf, loblolly, and longleaf pines and various species of oak. The best use for the less steep and less stony cleared areas is for growing lespedeza.

Edgemont stony loam, steep phase.—This phase covers a total of 3,776 acres on the narrow mountainous ridges in the east-central part of the county. Large areas are north of Spring Villa State Park and in the vicinity and to the north of Salem.

The surface layer is characterized by a large number of angular stone fragments varying from 2 inches square up to boulder and rock outcrops, with an average size of 6 to 8 inches on a side. The surface layer is dark-gray sandy loam to fine sandy loam 2 or 3 inches thick, underlain by yellowish-gray sandy loam to fine sandy loam 4 to 8

inches thick. The subsoil is usually yellow to brown clay to fine sandy clay grading into disintegrated rock. Numerous rock fragments and gravel are mixed throughout the soil profile, but there is sufficient concentration of them at and on the surface to make plowing almost impossible without removing large numbers of them.

The average slope of about 30 percent makes agricultural use impracticable. Considerable areas were cultivated at one time, but at present practically all of them are in forest, chiefly of oak with some shortleaf, loblolly, and longleaf pines. The open areas are possibly suited to kudzu. While there is considerable variation in the color and texture of the soil, its position, topography, and stoniness are rather uniform and make forestry its best use.

EUTAW SERIES

The soil of the Eutaw series, locally known in the Black Belt as "crawfish prairie" or "post oak flatwoods," is characterized by dark-gray to brownish-gray clay surface soil and light-gray heavy plastic clay subsoil mottled with brown. It is developed from beds of heavy clay and is acid throughout. Relief ranges from flat or undulating to gently sloping, and the natural surface drainage is fair to poor, but the internal drainage is slow. Eutaw clay is the only type mapped.

Eutaw clay.—All this soil (192 acres), which is known as "post oak" prairie, occurs in the southern part near Marvyn. The relief is nearly level to undulating, and both external and internal drainage are slow. Both surface soil and subsoil are acid. If the area were cleared for farm purposes, terracing would possibly be beneficial, partly to control erosion and partly for water distribution. Under timbered conditions the profile has the following characteristics:

0 to 2 inches, dark-gray to brownish-gray clay fairly high in organic matter.
2 to 5 inches, brownish-gray plastic clay slightly mottled with gray.
5 to 19 inches, mottled light-gray and brown to reddish-brown heavy plastic clay.
19 inches +, light-gray plastic clay mottled with bright reddish brown and some yellow.

All this land is in forest, consisting largely of oak, hickory, gum, and shortleaf, loblolly, and longleaf pines. Under present conditions timber and woodland pasture are probably its best use.

FLINT SERIES

The soil of the Flint series occurs in close geographic association with the Kalmia and Myatt soils. It has a brownish-gray sandy surface layer and a light-brown to heavy compact clay subsoil that becomes intensely mottled with gray and brown in the lower part. The parent material has been washed from soils of the Coastal Plain and deposited by streams when they flowed at higher elevation. The surface is nearly level to undulating, and the drainage is fair to good. Both surface soil and subsoil are medium to strongly acid. Only one type—Flint sandy loam—is mapped.

Flint sandy loam.—A total of 384 acres of this soil is mapped on nearly level to very slightly sloping or undulating relief in the southern part of the county along Odom Creek and between Little Uchee and

Hospilika Creeks. It does not require terracing to prevent erosion and is well suited to power machinery. While both external and internal drainage are slow, the soil is sufficiently drained for cotton, corn, and other crops. During periods of drought, crops frequently suffer from lack of moisture. This type is similar to Kalmia sandy loam but has a heavier and more compact subsoil. It has the following profile characteristics:

0 to 7 inches, brownish-gray loamy sand or sandy loam.
7 to 22 inches, light-brown to yellowish-brown compact clay to heavy sandy clay.
22 to 38 inches, light brownish-yellow compact clay to heavy sandy clay finely mottled with gray and brown.
38 inches +, yellow compact sandy clay strongly mottled with gray and brown.

About 70 percent of the total area is open for cultivation. Cotton, corn, hay, oats, and peanuts are usually grown. Cotton yields ¼ to ½ bale an acre where the soil is fertilized with 200 to 350 pounds of a 6–8–4 fertilizer or its equivalent; corn, 8 to 20 bushels when fertilized with 100 to 200 pounds of nitrate of soda; oats, 10 to 25 bushels when fertilized with 100 to 200 pounds of nitrate of soda.

Areas of Flint sandy loam, deep phase, too small to separate on the map are included. The principal difference between the two soils is that the deep phase has 12 to 30 inches of sandy surface soil overlying the clay subsoil. The deeper phase is much more productive than the type because of better moisture conditions.

GEORGEVILLE SERIES

The soil of the Georgeville series occurs in close association with the Goldston soil. It has a yellowish-gray silt loam surface soil and a yellowish-brown to light-red silty clay loam subsoil, which, at 8 inches, becomes light-red to dark yellowish-red heavy firm smooth but brittle silty clay or clay. This soil is developed from fine-grained slate, which occupies large areas in the Piedmont part of the Carolinas. It has undulating to rolling relief, and the natural surface drainage is good. On clean-cultivated areas sheet erosion has in many places been severe and has removed a large part of the original silt loam surface soil, exposing the red silty clay loam. Georgeville silty clay loam, which is moderately to strongly acid, is mapped.

Georgeville silty clay loam.—In general appearance this type closely resembles Cecil sandy loam, eroded phase, in that both are red soils and have undergone considerable erosion in localized areas. They also have essentially the same land use, management requirements, and crop adaptations, but the Cecil soils are derived largely from granite, whereas the Georgeville soils are largely from slate.

The relief is mildly undulating to rolling with the greatest slopes about 6 percent. As water penetrates the subsoil slowly, runoff is rapid and causes severe erosion. The areas are irregular-shaped and are not well suited to extensive agricultural methods and heavy machinery. This soil cannot be plowed soon after heavy rains without injurious structural effects, and thus early planting of spring crops is often difficult. The largest and most extensive areas are located

northwest of Bleecker and north of Salem. A total of 2,368 acres is mapped. This soil has the following profile characteristics:

0 to 4 inches, yellowish-gray silt loam to very fine sandy loam.
4 to 8 inches, yellowish-brown to light-red silty clay loam.
8 to 35 inches, light-red to dark yellowish-red silty clay with a blocky structure that is easily crushed into fine crumb structure.
35 inches +, reddish-brown silty clay streaked with grayish brown, brownish gray, brown, and red. Disintegrated slatelike rocks are reached at a depth of 40 to 60 inches.

Frequently fragments of schist and slate rock ¼ to ½ inch thick and ¾ to 1 inch broad are mixed throughout the profile and scattered over the surface. In places fragments of slatelike schist and rocks 3 to 8 inches on a side, which interfere somewhat with tillage operations, are scattered over the surface.

About 46 percent of the land is under cultivation and the rest, formerly under cultivation, has been abandoned and most of it supports a growth of shortleaf and loblolly pines. Cotton is the principal crop, although corn, oats, and hay are also grown. Cotton yields ¼ to ⅜ bale an acre where the soil is fertilized with 250 to 350 pounds of a 6–8–4 fertilizer or its equivalent, corn 5 to 15 bushels with 50 to 125 pounds of nitrate of soda, oats 10 to 35 bushels with 100 to 200 pounds of nitrate of soda. Hay and pasture crops are also fairly well suited to this soil; lespedeza does well.

GILEAD SERIES

The soils of the Gilead series are closely associated with the Norfolk and Ruston. In color they resemble the Norfolk but differ mainly in having a distinctly hard compact sandy clay subsoil. In most places the surface soil is lighter colored than that of the Norfolk, whereas the subsoil ranges from yellow to grayish yellow and is a compact sandy clay, which at a depth of a few inches grades into a mottled heavier material. These soils are developed from beds of unconsolidated heavy sandy clay and clay. They occur on sloping to hilly relief and are well to excessively drained in the surface layer, but the compact sandy clay subsoil restricts internal drainage. The depth of the sandy surface soil, coloration of the subsoil, and conditions of erosion vary. Both surface soil and subsoil are strongly acid. Gilead sandy loam and its eroded and eroded sloping phases and Gilead-Susquehanna sandy loams, eroded sloping phases, are mapped.

Gilead sandy loam.—The relief of this soil is undulating to gently sloping, the greatest slopes seldom exceeding 6 percent. The soil usually occurs on ridge tops or higher knolls, but it occurs also on lower slopes in association with Norfolk sandy loam, mainly in rather large areas on which heavy farming machinery may be used. The largest areas are in the southern part of the county near Loachapoka, Beehive, south of Chewacla State Park, near Mitchell Crossroads, in the vicinity of Marvyn, and near Meadows Crossroads and Hospilika Creek. A total of 14,912 acres is mapped.

Internal drainage is good in the surface layer, but poor in the soil as a whole. Water readily penetrates the sandy part, but it tends to flow horizontally over the compact layer when the surface soil is

saturated, thus causing severe erosion. Gullies 3 to 5 feet wide have resulted from one heavy rain taking the sandy surface entirely from the heavy subsoil. Terracing needs to be carefully managed.

This soil differs from Norfolk sandy loam in that it has a lighter textured surface soil and a compact sandy clay upper subsoil over a heavy clay lower subsoil that occurs at variable depths. In general, it has the following profile characteristics:

0 to 6 inches, light-gray loamy sand or sandy loam.
6 to 18 inches, light yellowish-gray loamy sand or sandy loam.
18 to 30 inches, yellow to grayish-yellow heavy compact sandy clay or heavy sandy loam.
30 inches +, yellow compact sandy clay material mottled and streaked with brownish red, yellow, and gray.

In the vicinity of Loachapoka the areas have a gradational layer of sandy material between the surface soil and the subsoil. In this particular area the soil is therefore more productive than most of the Gilead soils. Included also are a few small areas of Gilead sandy loam, eroded phase, where part of the original sandy surface soil has been removed by sheet erosion.

About 74 percent is cleared and cropped to cotton, corn, and oats. Cotton occupies about 60 percent of the cultivated area and corn 10 percent, while oats, peas, beans, and other crops for hay occupy the rest. The land planted to cotton usually receives 200 to 400 pounds of 3–8–5 or 4–8–4 commercial fertilizer an acre and is then top-dressed with 50 to 100 pounds of nitrate of soda or is fertilized with 200 to 400 pounds of a 6–8–4 fertilizer. Under these conditions cotton yields ⅓ to ⅜ bale an acre; corn 10 to 30 bushels when side-dressed with 100 to 200 pounds of nitrate of soda; oats commonly receive some top dressing of nitrate of soda while most other crops grown are of small acreage and not fertilized. The above yields can usually be exceeded by larger applications of fertilizer and the use of green-manure crops.

A small total area of Cuthbert sandy loam, originally mapped as that type, is included. Such areas are largely north and east of Marvyn, along the Russell County line toward Phenix City. The Cuthbert soil differs from the Gilead chiefly in that the subsoil is a yellowish-brown rather compact and heavy slightly plastic clay.

Gilead sandy loam, eroded phase.—This is a Coastal Plain soil differing from Norfolk sandy loam chiefly in that it has a shallower surface soil and a more compact subsoil. In general it borders the outer edge of the Piedmont province and is similar to the Chesterfield soils of that region. It has the following profile characteristics:

0 to 5 inches, yellowish-gray to light-gray loamy sand. Accelerated erosion has completely removed this layer in many places.
5 to 8 inches, pale-yellow compact sandy loam.
8 to 25 inches, compact hard brittle yellow sandy clay loam. Some red streaks may be present.
25 to 45 inches, yellow firm compact sandy clay mottled with red and brown.
45 inches +, unconsolidated sand and clay with various arrangements of red, somewhat pink, and gray materials.

While similar in color to Norfolk sandy loam, it is separated from it on account of the abrupt change from the sandy layer to a hard compact sandy clay loam. In some places the subsoil or clay layer is

yellowish red to yellowish brown. These spots are too small to show separately on the map. Several small areas originally separately mapped as Cuthbert sandy loam are included on the soil map as Gilead sandy loam. These areas are scattered over the southern part of the county. Areas of usually less than 1 acre that have had the gray sandy surface removed by erosion to leave yellowish material exposed are also often included with this eroded phase. This soil occurs both as narrow irregular-shaped bodies and broad regular-shaped areas in the southern part of the county. The more extensive tracts are near Mitchell Crossroads, Marvyn, Hopewell Church, south of Meadows Crossroads, and near U. S. Highway No. 29 south of Auburn. Of the 4,608 acres mapped, 70 percent is open for crops.

The relief varies from smoothly undulating to gently sloping, the steeper slopes seldom exceeding 7 percent. Many areas are difficult to terrace, while some are sufficiently broad and smooth to be easily planted and cultivated by heavy farming machinery, but in the main the areas are not well shaped for large machinery. The soil is well drained in the surface layer, but the compact character of the subsoil retards the downward movement of water and tends to cause the surface soil to become saturated in heavy rains and then erode away. Use of winter cover crops is very advantageous as a means of checking erosion and at the same time builds up the organic matter and moisture-holding capacity.

This eroded phase is cropped to cotton, corn, oats, and hay crops. The land used for cotton is normally fertilized with 200 to 400 pounds of a 6–8–4 fertilizer or its equivalent and produces ¼ to ½ bale an acre; corn yields 5 to 18 bushels when fertilized with 100 to 200 pounds of nitrate of soda; oats, 10 to 25 bushels when similarly fertilized. An occasional small area of Gilead sandy loam, Norfolk sandy loam and its deep phase, and Susquehanna sandy loam, too small and indeterminate to show separately, are included in the map. These variations are most likely to occur where areas of Gilead sandy loam grade into areas of these other soils.

Gilead sandy loam, eroded sloping phase.—Areas of this soil are irregular in shape and when terraced small irregular-shaped fields are formed. The relief ranges from sloping to hilly or from a 6- to 12-percent slope. Surface drainage is therefore good to excessive, and erosion has been severe. It is one of the most severely eroded soils of the county because of the combination of sloping to hilly relief with the compact subsoil, which retards the downward movement of water, causing it to move off laterally.

A total of 13,632 acres is mapped in the more broken southern part. The largest areas are south of Chewacla State Park, south of Mitchell Crossroads, in the vicinity and south of Parkers Crossroads, and southwest of Meadows Crossroads.

This phase is somewhat similar to Chesterfield sandy loam, sloping phase, and differs from Gilead sandy loam chiefly in degree of slope and erosion. It has the following profile characteristics:

0 to 5 inches, gray loamy sand or sandy loam.
5 to 36 inches, yellow to light yellowish-brown heavy compact sandy clay.
36 inches +, grades into strata of heavy clay or sand and water-worn gravel.

About 40 percent of this soil is clear for cultivation, but probably not more than 25 to 30 percent is cultivated annually. Only the more gently sloping areas, where erosion can be controlled by terraces, should be farmed. Crop yields are normally low. Cotton yields ¼ to ½ bale an acre where the soil is fertilized with 200 to 300 pounds of a 6–8–4 fertilizer or its equivalent. The yield of corn and oats varies from 4 to 15 bushels when fertilized with 100 to 150 pounds of nitrate of soda. The cleared areas, occurring on the more rolling topography, should be planted to kudzu (pl. 3, *A*) or timber. The timbered areas, which constitute about 60 percent of the total, grow largely loblolly, shortleaf, and some longleaf pines.

Occasional small included spots are present where all the sandy surface has been eroded away, leaving the yellow sandy clay subsoil exposed. There are also some spots where the sandy surface covering is as thick as 18 inches.

Gilead-Susquehanna sandy loams, eroded sloping phases.—This designation covers a complex association of Gilead sandy loam, Cuthbert sandy loam, Susquehanna sandy loam, and an eroded phase of each of these soils. These occur in such close association that the small individual soil areas could not be separated on the scale of mapping. The general appearance of a plowed field is gray, brown, somewhat red, and yellow in close association and thoroughly mixed over the field. The sandy loam spots may be either Gilead, Cuthbert, or Susquehanna sandy loams. The red eroded clay loam or clay spots may be Susquehanna clay or a severely eroded spot of Cuthbert sandy loam, while the yellow clay loam spots are severely eroded spots of Gilead sandy loam. The most outstanding characteristics of the complex are its heavy compact subsoil, susceptibility to erosion, droughty condition, and irregular-shaped areas.

Of the 1,344 acres mapped, the largest areas are in the southwestern part of the county, south of Chewacla State Park, near Mount Vernon Church, and south of Beehive. The relief ranges from sloping to hilly, with slopes of 6 to 12 percent, averaging about 9 percent. Surface drainage is good to excessive, and, if cleared or cultivated, the soil is subject to severe erosion. The areas are irregular in shape, and when terraced, fields are small and difficult or impractical to handle with power machinery. A small proportion is cultivated annually, chiefly on the more gently sloping positions, where erosion can be held to a minimum by good soil and crop management.

Cotton, corn, and oats are the principal crops. Cotton normally yields ¼ to ½ bale an acre where the soil is fertilized with 200 to 300 pounds of a 6–8–4 fertilizer or its equivalent. Corn and oats yield 5 to 15 bushels when fertilized with 100 to 150 pounds of nitrate of soda. This soil is better suited to kudzu or timber than to cultivated crops. Kudzu can be established sufficiently in a period of 3 to 5 years, so that considerable grazing can be obtained. The forested areas are principally in loblolly and shortleaf pines and scrub oak.

GOLDSTON SERIES

The soil of the Goldston series represents a soil condition rather than a type with a definite profile. It bears the same relation to the Georgeville soils as the Wilkes soil does to the Cecil, Appling, Durham,

and Helena. The Goldston, which is acid, is developed from slate and associated fine-grained rocks and in many places has a large quantity of slate fragments on the surface or bedrock near the surface. Relief ranges from sloping and rolling to steep, and surface drainage is good throughout. Sheet erosion is active on cleared areas. Only one type—Goldston slaty loam—is mapped.

Goldston slaty loam.—Even though the slopes are not severe (3 to 5 percent, some as much as 7 percent), erosion is difficult to control. This is due to the heavy character of the subsoil and in many places to the nearness of the rock to the surface, which does not allow water to penetrate readily, and also to the irregular-shaped areas and slopes, which make terracing and terrace maintenance difficult.

The soil varies in both color and drainage. It ranges from an excessively drained condition in which it is brown to yellowish brown to a slowly drained condition in which it is yellowish gray. Some areas also contain many platy fragments of slate together with some quartz fragments on the surface, both of which interfere somewhat with cultivation. This type has the following profile characteristics:

0 to 5 inches, brownish-gray loam to very fine sandy loam that contains many slatelike and angular quartz fragments.
5 to 8 inches, yellowish-gray to brownish-gray friable silty clay loam.
8 to 20 inches, yellowish-brown to reddish-brown firm smooth clay mottled with some gray, red, and brown.
20 to 30 inches, yellow rather heavy sticky clay mottled with red, gray, and yellow or slate material mixed with silty clay.
30 inches +, disintegrated dark-colored slatelike rocks and granite. In many places this rock is near the surface and there is no uniformity in the color or depth of soil.

Small areas occur in close association with the Cecil, Georgeville, and Helena soils. Only 256 acres are mapped, about 33 percent in open land and the rest in forest. The principal trees in the forested areas are loblolly, shortleaf, and longleaf pines, post and blackjack oaks, sweetgum, and black tupelo. The tilled areas are used principally for cotton and corn. Cotton yields ⅛ to ½ bale an acre; corn, 5 to 15 bushels. These yields are increased considerably by growing winter or summer legumes and by the more liberal use of commercial fertilizers. The smoothest and deepest areas and those having the most uniform soil conditions can be economically cultivated, whereas the more slaty areas should be in kudzu or trees.

GRADY SERIES

The soil of the Grady series occurs in basinlike areas and sinks or along imperfect drainageways in the Coastal Plain, in close association with the Marlboro, Macon, and Norfolk soils. Natural surface drainage is poor, and in many places water stands on the surface for several days after heavy rains. Only one type—Grady sandy loam—is mapped.

Grady sandy loam.—A total area of only 256 acres of this light-gray poorly drained soil is mapped. It occurs in small areas of usually less than 10 acres scattered over the Coastal Plain or southern part of the county in the vicinity of Marvyn. The soil occupies pond sites or old pond sites that have become partly drained. The relief is nearly flat and some areas occupy saucerlike depressions. Drainage

is naturally poor and artificial drainage is needed before this soil can be cropped or used for pasture. Much of it is covered with water during winter and early spring. It has the following profile characteristics:

0 to 7 inches, dark-gray sandy loam.
7 to 18 inches, light-gray to nearly white sand or loamy sand.
18 inches +, gray mottled with brown and yellow heavy tough clay.

About 13 percent of the soil has been cleared and supports some pasture, while the rest is in woodland or grass. The tilled areas are used largely for sugarcane and some corn. Sorghum produces large quantities of sirup of excellent quality. Most of the areas can be developed into fair to good pasture, as carpet grass is especially well adapted.

GUIN SERIES

The soil of the Guin series is developed from beds of sand, sandy clay, clay, and gravelly material and occurs on steeply sloping to hilly relief. Drainage is good to excessive. Erosion is severe wherever the land has been cultivated. Small rounded quartz gravel occurs in large quantities, and in places there are some gravel hills and iron crust. Guin sandy loam, steep phase, which is strongly acid, is mapped.

Guin sandy loam, steep phase.—This soil occupies a total of 7,168 acres in the southern part of the county. The largest areas are west of Chewacla Creek, east and north of Odom Creek, south of Mitchell Crossroads, 2 miles west of Whatley Crossroads, along Watoolee Creek, in the vicinity of Hopewell Church, near Griffin Mill, and 2 miles north of Phenix City (Russell County).

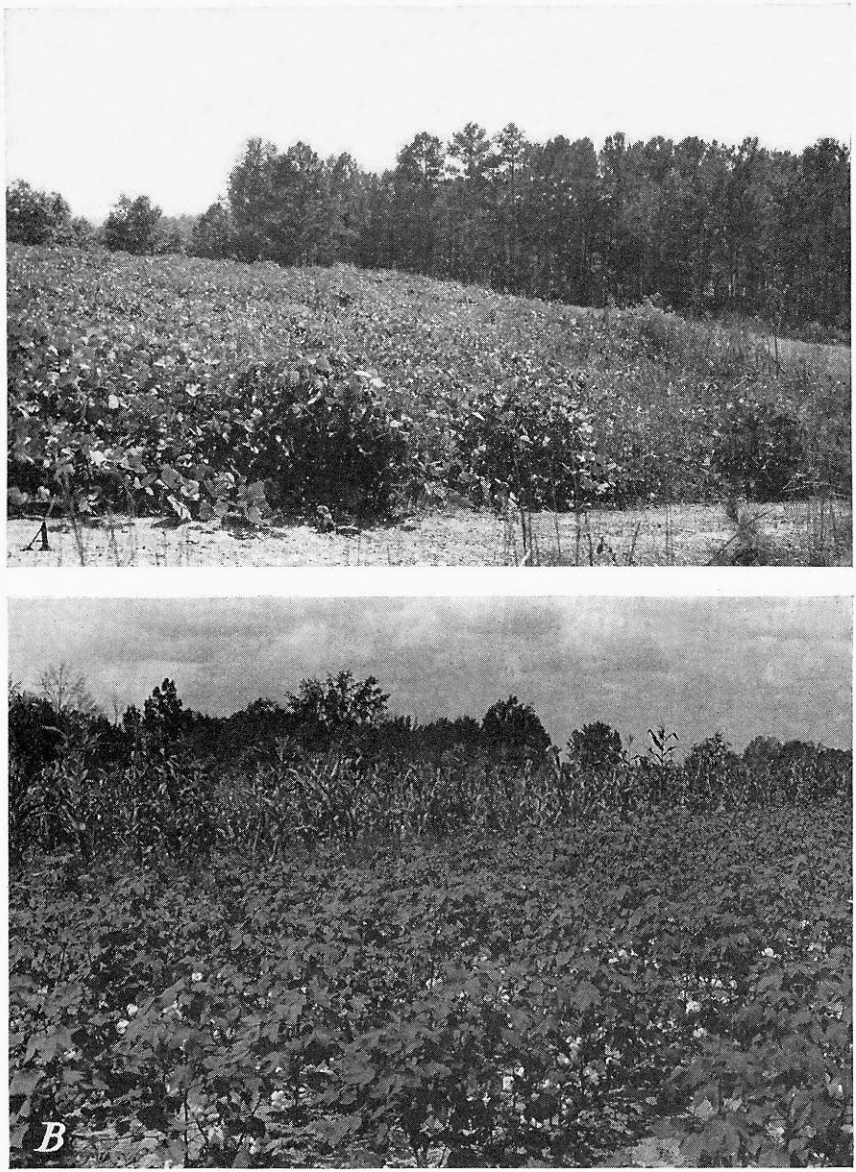
This phase is on slopes of 18 to 40 percent that prohibit cultivation. The slopes are short but steep, and erosion has been and still is severe even though the areas are in woodland or cut-over timber.

This soil is used mainly for growing timber, largely loblolly and shortleaf pines, scrub oak, and some longleaf pine. Small areas on the more gently sloping positions are open for cultivation. The cleared areas are used for garden vegetables and cotton patches, yields on the latter being low. Kudzu may be grown advantageously on the cleared areas, as it will control erosion and supply temporary grazing for cattle, but some fertilization may be necessary to get it started.

HELENA SERIES

The soil of the Helena series occurs in the southern Piedmont province in close association with the Wilkes, Iredell, and Appling soils. It is characterized by light-gray to grayish-yellow sandy surface soil and yellow to yellowish-gray mottled with red and reddish-brown heavy plastic sandy clay or clay subsoil. The soil is developed from binary or aplitic granite and gneiss cut in places by dikes of basic rocks. The relief ranges from undulating or gently rolling to steeply sloping. Surface drainage is good to fair, but internal drainage is slow. The soil is medium to strongly acid in reaction. Only one type—Helena sandy loam—is mapped.

Helena sandy loam.—This type closely resembles the Appling soils in general surface appearance, but it differs from them in that it is not so well drained and has a heavier more plastic and mottled sub-



A, Kudzu on Gilead sandy loam, eroded sloping phase. The erosive character of this soil on a steep slope makes it unsuited to general farm crops. (Soil Conservation Service photograph.) *B*, Cotton and corn on an area of Norfolk sandy loam, which is commonly used for rotation of these crops.

A, Kudzu on an abandoned area of Louisa clay loam, rolling phase, which is well suited to this crop. *B*, An area of Louisa sandy loam, eroded rolling phase, showing results of erosion and boll weevil infestation on land previously planted to cotton. Bench terraces in background were constructed on a large part of these areas 50 to 100 years ago. Such areas of idle land may be reclaimed by kudzu. (Soil Conservation Service photograph.)

soil. Depth of the sandy surface layer over the heavy clay varies from 3 to 18 inches within short distances. The shallower areas are on slopes where the surface has a yellow or brownish cast. In some locations an occasional large rounded boulder as much as 20 feet in diameter is present. Many areas also have an abundance of quartz fragments scattered on the surface. The largest areas are in the extreme southeastern corner of the county near Bleecker and Smiths Station. A total of 2,432 acres is mapped. This soil has the following profile characteristics:

0 to 4 inches, light-gray to grayish-yellow sandy loam to fine sandy loam. This loam is occasionally missing and in spots is as much as 12 inches thick.
4 to 12 inches, grayish-yellow to mixed gray and yellow heavy sandy loam to sandy clay loam.
12 to 30 inches, yellowish-gray plastic clay strongly mottled with red and reddish brown.
30 inches +, gray clay strongly mottled with red and reddish brown. At about 4 feet disintegrated binary granite rocks are present.

While the larger areas occur on slopes of less than 7 percent, in the main they are undulating to gently sloping. Surface drainage is good to excessive, whereas internal drainage is slow. The heavy character of the subsoil causes this soil to be very erosive even though the slopes may be steep. In many places it is, therefore, advisable to terrace for erosion control. On slopes of 6 to 7 percent it is often advantageous to establish a permanent grass crop, as sericea lespedeza or kudzu.

Only about 15 percent is open for cultivation, with the rest in timber or woodland pasture. Cotton, corn, oats, and hay crops are the principal crops grown. Cotton produces ¼ to ½ bale an acre where the soil is fertilized with 200 to 350 pounds of a 6–8–4 fertilizer or its equivalent, corn 5 to 18 bushels when fertilized with 100 to 200 pounds of nitrate of soda, and oats 8 to 25 bushels when fertilized with 100 to 150 pounds of nitrate of soda. Hay crops are seldom fertilized and soybeans normally produce ½ to 1 ton of hay. The forested areas grow shortleaf, loblolly, and longleaf pines, post and blackjack oaks, sweetgum, and underbrush.

HERNDON SERIES

The soil of the Herndon series occurs in the southern Piedmont province in close geographic association with the Georgeville and Goldston soils. It is developed from fine-grained schist and slate with some impure quartzite. The surface soil is light gray or yellowish gray; the subsoil, light yellowish-brown to yellowish-brown firm slightly compact clay or heavy fine sandy clay. Relief ranges from undulating to gently sloping, and drainage is good throughout. Some sheet erosion has occurred on the more sloping areas under clean cultivation. Herndon fine sandy loam, the only type mapped, is strongly acid.

Herndon fine sandy loam.—Even though derived from different materials this soil is closely associated with the Cecil soils. The largest and most extensive areas are 1½ miles south of Opelika, near Salem, and within one-half mile of Powledge. This type occurs in a total of 1,536 acres on a favorable relief for agriculture, as the slope

seldom exceeds 5 percent. Despite this fact, erosion is rather active on most areas that are in clean cultivation and not carefully terraced. Well-constructed terraces are generally ample for controlling erosion in cultivated fields; however, a few small areas have such steep slopes that they should be retired from cultivation.

This soil is somewhat similar to Appling sandy loam but differs in that it is finer textured and slightly heavier in the subsoil and contains some small slatelike fragments on and in the surface soil. It has the following profile characteristics:

0 to 7 inches, yellowish-gray fine sandy loam locally containing a few platy fragments.
7 to 10 inches, pale-yellow friable fine sandy clay.
10 to 24 inches, yellow to light yellowish-brown firm slightly compact heavy fine sandy clay.
24 to 40 inches, brownish-yellow to reddish-yellow heavy silty clay mottled with gray, red, yellow, and brown. The mottlings increase with depth.
40 inches +, disintegrated fine-grained schist and slatelike rocks.

About 71 percent is open land, and the rest is in forest largely of shortleaf, loblolly, and longleaf pines, post and blackjack oaks, sweetgum, and black tupelo. The cultivated areas are used largely for cotton, corn, hay crops, peanuts, and sorghum, with cotton and corn dominating. Cotton normally yields ⅛ to ⅜ bale an acre depending on the quantity of fertilizer applied while corn and oats yield 15 to 20 bushels. The soil responds fairly satisfactorily to soil improvement practices, and these yields can be considerably increased by the regular use of winter or summer legumes or by the liberal use of commercial fertilizers.

HIWASSEE SERIES

The soil of the Hiwassee series occurs on old high terraces or second bottoms along the streams in the Piedmont province. It is characterized by brown surface soil and dark-red to reddish-brown heavy firm clay subsoil, usually several feet thick. The parent material was washed from soils in the Piedmont province and, to a less extent, from soils in the Blue Ridge Mountains, and brought down and deposited when the streams flowed at much higher levels. The surface is smooth to gently sloping, and the surface drainage is good throughout. Some sheet erosion is noticeable on the sloping areas. Hiwassee fine sandy loam, the only type mapped, is medium acid.

Hiwassee fine sandy loam.—Situated on high second-bottom positions along the Chattahoochee River and the larger streams of the Piedmont area, this type is one of the most productive soils for crops, especially cotton and oats. The largest areas of this soil are mapped in the extreme northeastern part, 1 mile southwest of Smiths Station, west of Meadows Crossroads, and half a mile southeast of Lake Chewacla. A total of 320 acres is mapped. It occurs on smooth slightly sloping relief and requires little terracing for erosion control when used for clean-cultivated crops. The greatest slopes do not exceed 5 percent, machinery can be used satisfactorily, and drainage is naturally good. It has the following profile characteristics:

0 to 6 inches, brown mellow heavy fine sandy loam.
6 to 30 inches, dark-red to reddish-brown heavy sandy clay to moderately heavy clay. This material is slightly compact in place, but it is granular enough so that moisture and root movements are relatively free.

30 inches +, dark reddish-brown heavy sandy clay that with depth becomes a little lighter in texture than the layer above. It is also compact in places, but it is sufficiently granular for root and moisture penetration.

Crop yields are generally good, and practically all the soil is being used for crops, chiefly cotton, to which it is especially well adapted. Cotton yields ⅜ to 1 bale or more an acre where the soil is fertilized with 350 to 600 pounds of 6–8–4 fertilizer or its equivalent, corn 15 to 35 bushels, oats 20 to 50 bushels, and hay crops do well under good management. Both corn and oats are given a light application of fertilizer.

Part of the soil included on the map has a dark reddish-brown clay loam surface. Owing to the small total area the clay loam and sandy loam areas are not shown separately on the map. An area about half a mile southeast of Chewacla State Park has a clay loam surface, and an area in the southeastern corner of sec. 10, T. 20 N., R. 29 E., is about half clay. A number of areas contain much water-worn gravel, which does not seriously interfere with cultivation.

IREDELL SERIES

The soil of the Iredell series is characterized by brownish-gray surface soil and light yellowish-brown heavy plastic clay subsoil with some mottles or splotches of light gray in the lower layer. It is associated in origin and geographic position with the Davidson soils and is developed from dark-colored basic rocks, as hornblende schist and diorite. The surface is undulating to gently sloping. The surface drainage is fair, but internal drainage is poor because of the heavy plastic clay subsoil. Iredell loam, the only type mapped, is medium acid.

Iredell loam.—As this soil is heavy, hard to plow, and cannot be cultivated early in spring, it is little used for crops. The relief varies from 3 to 6 percent or is mildly undulating. External drainage is fair, and internal drainage is slow. The largest areas are about 2 miles west of Goat Rock Dam, in the vicinity of Bleecker, near Mount Jefferson, and in the extreme southwestern corner of the county. A total of 512 acres is mapped. Associated with the Davidson and Lloyd soils, this type has the following profile characteristics:

0 to 4 inches, brownish-gray loam to fine sandy loam having numerous small iron concretions on the surface and mixed through the soil.
4 to 20 inches, light yellowish-brown heavy plastic clay having a greenish cast.
20 inches +, disintegrated and decomposed basic rock, mainly dioritic.

Considerable variation exists in the soil with regard to texture and depth. In some cases the subsoil is a fairly friable sticky fine sandy clay extending to a depth of 18 to 24 inches. Locally soft rock material is present at 12 to 15 inches below the surface.

Of the 23 percent of this type open for cultivation, about 10 percent is cropped to cotton in a rotation with oats and hay. Cotton yields are low, but fair returns of oats and hay are obtained. Corn raised in the eastern part of the county yields 10 to 20 bushels an acre. Most of the remaining part of the open areas is idle or is growing small pine. The forested areas grow principally sweetgum, shortleaf, loblolly, and longleaf pines, black tupelo, black oak, post oak, and

various other oaks. The best use for this soil is for pasture grasses or timber.

IUKA SERIES

The soil of the Iuka series, Iuka silt loam, occurs in first bottoms along streams in the Coastal Plain in close association with the Bibb soil. It has a light-brown to brown surface soil and brownish-gray subsoil. As it has been formed from materials washed from acid soils in the Coastal Plain and deposited by streams, it is strongly acid. The surface is nearly flat. Natural surface drainage is imperfect, and internal drainage is poor because of the nearness of the water table to the surface.

Iuka silt loam.—This nearly flat first-bottom land is subject to frequent overflow; the upper 6 to 10 inches is normally fairly well drained, but the lower part of the subsoil is usually wet a large part of the year. About 15 percent of this land has been cleared, but only a few scattered areas are planted to oats, corn, and sugarcane; the rest is pasture and woodland. Good yields are obtained when high water does not prevent crop production.

Occurring in the first bottoms along the streams in the Coastal Plain, this soil is similar to Alluvial soils (Bibb soil material). It is similar in drainage and color to Chewacla silt loam. A profile description is as follows:

0 to 10 inches, brown granular friable silt loam, the upper inch containing a small quantity of leafmold in places.
10 to 18 inches, brownish-gray friable silt loam.
18 inches +, light-gray heavy silt loam mottled with yellow and brown.

The total of 640 acres is mapped largely along Little Uchee and Hospilika Creeks near the Russell County line.

Good stands of timber occur on part of this soil. The chief trees are shortleaf and loblolly pines, sweetgum, black tupelo, red maple, sycamore, oaks, yellow-poplar, with a fairly dense undergrowth of shrubs, bushes, and young trees. In practically all the areas good pasture can be developed by removing most of the trees, seeding to pasture grasses, and adding lime and phosphate fertilizers.

Small areas of Bibb and Ochlockonee silt loams, too small to separate, are included in mapping.

KALMIA SERIES

In the Kalmia series the surface layer is yellowish gray and sandy and the subsoil weak-yellow friable sandy clay. Kalmia sandy loam, the only type mapped, is moderately to strongly acid and occurs on the second bottoms and terraces along the streams in the Coastal Plain. This naturally well-drained soil having a nearly flat surface is associated with the Flint soil and resembles the Norfolk in color. It is developed from fine-textured material washed from soils in the Coastal Plain and brought down and deposited by the streams when they flowed at higher levels. Locally there is a mixture of materials brought down by the streams that head in or flow through the Piedmont province.

Kalmia sandy loam.—This soil occupies a benchlike or second-bottom position above normal overflow and has a smooth nearly flat surface. The water table is nearer the surface than in the Norfolk

soils, which together with the position and smoother relief are the chief differences between this soil and Norfolk sandy loam. Although the water table is nearer the surface than in soils of the uplands, this soil is sufficiently well drained under natural conditions for all crops of the area. The most numerous of the small areas comprising this soil are along Chewacla and Watoolee Creeks. A total area of 640 acres is mapped.

This type is similar in color, texture, and structure to Norfolk sandy loam but differs from it in that it occurs on second bottoms, whereas the Norfolk soil occurs on upland positions. In cultivated areas it has the following characteristics:

0 to 5 inches, yellowish-gray loamy sand.
5 to 18 inches, weak-yellow loamy sand to light sandy loam.
18 to 40 inches, yellow friable heavy sandy loam or light friable sandy clay.
40 inches +, mottled yellow, brown, and light-gray slightly compact sandy clay.

Even though relatively poor, this soil can be built to a fair state of productivity by the use of mineral fertilizers and the incorporation of organic matter. Cotton yields normally range from ⅜ to ⅝ bale an acre when the land is given an application of 200 to 300 pounds of a 6–8–4 fertilizer or its equivalent; corn and oats yield 8 to 25 bushels when 100 to 200 pounds of nitrate of soda are used as a side dressing. Turning under a cover crop is the best source of nitrogen for corn. Peanuts, grapes, and watermelons do well on this soil.

Associated with areas of this soil are a few areas ranging in size from 1 to 10 acres where the sandy layer overlying the sandy clay is more than 36 inches deep. If the areas of this sand were more extensive, they would be separated as Kalmia sand. Other small included areas too small to separate resemble Flint sandy loam. These latter areas have a more compact and heavier subsoil than Kalmia sandy loam. About 75 acres of Kalmia sandy loam, imperfectly drained phase, are included with this soil; these areas occur between Little Uchee and White Creeks. Very little of this phase is in cultivation.

LLOYD SERIES

The Lloyd soils are closely associated with the Davidson and Cecil. In color they resemble the Davidson but contain more sand throughout the profile and have a dominantly shallower subsoil over the rock. They are developed from a mixture of acid and basic rocks, and their reaction is slightly to medium acid. Fragments of rock occur on the surface, and layers of broken rock may be near the surface. The soils are brown in the surface layer and have a dark-red or moderately reddish-brown heavy subsoil. The relief ranges from undulating to strongly sloping, with some rolling to hilly areas, and the drainage is good throughout. Sheet erosion is severe on cultivated areas on the steeper slopes. Lloyd sandy loam and the rolling phases of Lloyd clay loam and Lloyd stony loam are mapped.

Lloyd sandy loam.—This type is intermediate between the Davidson and Cecil soils and occurs in close association with them. It is developed from a mixture of hornblende schist, granite, and gneiss and occurs on almost level to gently rolling relief. The steepest slopes are usually less than 5 percent, and erosion is not serious.

Terracing is generally helpful but is not everywhere essential. Internal and external drainage are good, and the surface soil and subsoil are sufficiently granular to allow free downward water movement and penetration by plant roots.

Areas of its 1,664 acres are scattered over much of the northern part of the county—the largest and most extensive 1½ miles northeast of Roxana, in the vicinity of Macedonia Church, Flat Rock School, Stonewall, and along State highway No. 37 near the Chambers County line. Occasional small spots of 1 acre or less are included where the surface is a clay loam, but such areas are not extensive or numerous. It has the following profile characteristics:

0 to 5 inches, dark-brown sandy loam or fine sandy loam.
5 to 13 inches, dark-brown to dark reddish-brown sandy clay.
13 to 25 inches, dark brownish-red or red heavy clay breaking down into a blocky structure.
25 to 48 inches, reddish-brown heavy clay having a blocky structure, the blocks ½ to 1 inch on a side and coated with brown colloidal material.
48 to 72 inches, red to light-red compact clay grading into fairly loose yellowish-red clay at lower depths.

This sandy loam is one of the best agricultural soils in the county. It is especially important because of its high inherent fertility, level to gently rolling relief, and wide crop adaptation. Approximately 90 percent is under cultivation, probably three-fourths of it in cotton and the rest in corn, oats, or hay. Under good management cotton yields ½ to 1 bale or more an acre where the soil is fertilized with 300 to 600 pounds of a 6–8–4 fertilizer. Corn yields 15 to 35 bushels, but 25 to 45 bushels may be obtained following a green-manure crop or when side-dressed with 200 to 225 pounds of nitrate of soda. Soybeans, oats, sorghum, and cowpeas, the principal hay crops, all yield well.

Lloyd clay loam, rolling phase.—A total of 192 acres of this soil is mapped, mostly in the northern and northwestern parts of the county, in close association with Lloyd stony loam, rolling phase, and Davidson clay loam. The relief is rolling, sloping, and hilly, with slopes of 5 to 12 percent or more. All areas are well to excessively drained, and sheet erosion is and has been active on most fields under clean cultivation.

To a depth of 5 to 8 inches the surface soil is dark-brown to reddish-brown clay loam moderately friable and crumbly. The reddish-brown to dark-red heavy clay subsoil breaks under normal moisture conditions into irregular-shaped lumps and assumes a somewhat blocky structure. The subsoil is 20 to 40 inches thick or more and is underlain by disintegrated dark-colored basic rock and some gneiss. Both the surface soil and subsoil are slightly to medium acid. It is possible that some or all of this soil at one time had a loam or sandy loam surface, later partly removed by sheet erosion. Under cultivation the upper part of the subsoil has gradually been mixed with the plow layer. Angular fragments of hornblende schist rock are on the surface, and in some places the bedrock comes near the surface.

Only a small part of this phase is under cultivation. The rest is forested to second-growth hardwoods, mainly oak and hickory, but some abandoned areas are now grown up to shortleaf and loblolly

pines, and a few areas are considered as idle land where broomsedge and briers prevail. Some corn, oats, and hay are grown, and the yields are considerably less than those obtained on Lloyd sandy loam under similar treatment. Lespedeza and kudzu do well. This is inherently a good soil and is capable of being built up to a fair state of productivity. Legumes do well and much larger yields may be obtained by turning them under and by the addition of barnyard manure. This soil is treated in the same manner as Davidson clay loam.

Terracing, contour cultivation, and strip cropping should be practiced, especially on the more sloping areas, to protect the soil from further sheet erosion. The steeper areas that are not now in woodland should be planted to kudzu or trees.

Lloyd stony loam, rolling phase.—The more gently sloping areas of this phase may be used satisfactorily for crops if the areas are not too stony, are carefully terraced, and the terraces properly maintained. The normal slope is 7 to 12 percent, but a few areas having more gradual slope are included. Drainage of both surface soil and subsoil is good to excessive. Erosion in places has been severe, and locally gullying has resulted. The more steeply sloping areas should be planted to kudzu or to forest if not already in woodland. The total area of 7,232 acres is mapped chiefly in the vicinity of Roxana in the northwestern part of the county.

This stony soil has a red surface soil resembling Davidson clay loam. The surface consists of 4 to 8 inches of dark-brown clay loam with many diorite, hornblende gneiss, and granitic rocks 6 to 20 inches in diameter scattered over the surface. Some quartz sand mixed through this soil makes it friable enough to have good tilth properties. The subsoil is reddish-brown clay and ranges from rather compact to moderately friable and granular material at a depth of 20 to 48 inches. In places noticeable grains of coarse and medium quartz sand are mixed through this layer. Beneath this depth the material becomes lighter brown and grades into red and ocherous-yellow clay and soft hornblende rock.

About 26 percent of the total area of this soil is open for cultivation, and fair yields are obtained on these areas. Yields of ¼ to ½ bale of cotton are obtained with an application of 150 to 300 pounds of a 6–8–4 fertilizer or its equivalent, and corn yields 8 to 20 bushels when 100 to 200 pounds of nitrate of soda are used. The greatest drawbacks to this soil for agricultural purposes are the rolling and stony conditions, which make tillage difficult and expensive. Stones in most areas interfere with the use of farm implements.

Areas of this soil may be developed into fair pasture land, as it is well adapted to pasture grasses. Kudzu should be planted on the more rolling areas where timber is missing. The greater part of the total area should remain in timber, the soil being well suited to the production of shortleaf and loblolly pines. The forested areas grow largely pine, various species of oak, sweetgum, black tupelo, hickory, dogwood, and various other trees.

LOUISA SERIES

The soils of the Louisa series are developed from mica schist and occur in close association with the Madison and Cecil soils but differ

from them in being micaceous through the surface soil and subsoil and in not having a well-developed subsoil. The surface soil is brown to reddish brown, and the subsoil red to light-red friable micaceous clays, possessing a smooth greasy feel because of the large quantity of finely divided mica. In some places no real subsoil is developed, the surface soil resting directly on weathered mica schist. Sheet erosion and gullying have been severe in places where clean cultivation has been practiced. The surface ranges from undulating to strongly sloping and hilly, and natural drainage is good to excessive. These soils are medium to strongly acid. Louisa clay loam and its rolling phase and Louisa sandy loam, eroded rolling phase, are mapped.

Louisa clay loam.—Areas of this soil occur on narrow elongated ridges in the northern part of the county, particularly north of Auburn and in the vicinity of Blanton. A total of 960 acres is mapped. The relief is similar to that of Cecil clay loam and is undulating to rolling with the steepest slopes seldom exceeding 7 percent. Drainage is good, and terraces are needed to retard runoff, so as to prevent erosion and to conserve moisture for plants. The use of this soil is similar to that of Cecil clay loam, except that more of it has been severely damaged by sheet and gully erosion and less of it has remained under cultivation. It is probable that this soil had an original covering of fine sandy loam that has been largely removed by accelerated erosion. This type has the following profile characteristics:

0 to 4 inches, reddish-brown granular or friable clay loam having a shiny tint owing to the presence of mica flakes.
4 to 16 inches, dark-red to reddish-brown heavy to friable clay containing a large quantity of mica scales. When dry the material breaks readily into cubes or blocks of ½ to 1 inch on the side. It is very micaceous and has a greasy feel.
16 to 30 inches, loose friable red to light-red micaceous clay having a smooth, greasy feel.
30 inches +, rotten soft mica schist that in many places comes to within 12 inches of the surface.

Practically all areas have been cultivated, but only 50 percent is now open for cultivation, the rest having been abandoned and allowed to grow up to shortleaf and loblolly pines and various oak. Cotton, corn, oats, and hay crops are the principal cultivated crops. Cotton produces ¼ to ½ bale an acre when the land is fertilized with 200 to 300 pounds of a 6–8–4 fertilizer or its equivalent. Corn produces 5 to 15 bushels and oats 8 to 20 bushels, when the land is fertilized with 100 to 200 pounds of nitrate of soda.

This soil should be used in a rotation of grain, hay, and pasture crops that keeps the surface covered with a sod all or the greater part of the year. The soil tends to be droughty for summer crops, especially corn, and therefore it is best suited to spring and winter crops. Deeper plowing and the incorporation of organic matter would improve tilth and moisture conditions. Terracing and strip cropping are recommended on the more sloping areas.

A few areas of Madison sandy loam of indeterminate size are included on the map. The two gradually merge into each other.

Louisa clay loam, rolling phase.—This phase differs from Louisa clay loam in slope and degree of erosion. The relief varies from gently rolling to hilly, with an average slope of 7 to 12 percent. Drainage is

rapid, erosion severe, and many deep gullies have formed. Sheet erosion is detrimental to unprotected areas. Carefully constructed and maintained terraces are essential if this soil is to be used for clean-cultivated crops. Terraces are difficult to maintain because the micaceous material does not afford enough binding power to hold the soil together. The largest areas occur near Blanton, Halawaka, and in the vicinity of North Auburn, Flat Rock School, and Auburn. A total of 4,480 acres is mapped. This soil has the following profile characteristics:

0 to 4 inches, red friable granular clay to clay loam.
4 to 10 inches, red moderately heavy clay containing numerous mica flakes and having a greasy feel.
10 to 18 inches, red loose friable micaceous clay and disintegrated mica schists, possessing a slick and greasy feel.
18 inches +, rotten mica schist and some lenses of quartz, the depth varying from 6 to 30 inches.

The more gently sloping areas may be used for clean-cultivated crops, whereas the steeper slopes are better suited to kudzu or timber. The forested areas, constituting about 68 percent of the total area, consist principally of shortleaf and loblolly pines and some oak.

Crop yields are normally low. Cotton produces ⅛ to ½ bale an acre, when the land is fertilized with 200 to 300 pounds of a 6–8–4 fertilizer or its equivalent; corn produces 4 to 12 bushels and oats 8 to 15, when 100 to 200 pounds of nitrate of soda are applied to the land; soybeans ¼ to ½ ton of hay with no fertilizer. Kudzu may be used to reclaim some of the abandoned areas (pl. 4, *A*).

Louisa sandy loam, eroded rolling phase.—Erosion has given this soil a surface appearance of alternating red and gray spots. Originally it was entirely covered with a gray sandy surface. The largest areas are northwest of Auburn, near Sougahatchee Creek, northwest of Pepperell and Mount Jefferson, east of Robinson Creek, and in the vicinity of Tillery Crossroads. A total area of 5,632 acres is mapped.

This phase differs from Madison sandy loam in slope and in degree of erosion. The slopes range from 7 to 12 percent, and gully and sheet erosion have been active in many areas. The soil differs from Cecil sandy loam, eroded phase, in that it contains more mica and therefore has a looser and more friable subsoil. It has the following profile characteristics:

0 to 4 inches, brownish-gray to brown sandy loam. This layer may be completely missing.
4 to 12 inches, red to reddish-brown firm but fairly friable clay containing a large quantity of fine mica flakes.
12 to 24 inches, red friable clay loam having a high percentage of mica; feels slick and greasy.
24 inches +, soft disintegrated mica schist.

Only 11 percent of this soil is open for cultivation, and a large part of this is used for pasture. Crops common to the county may be grown, but the yields are normally rather low. The more gently sloping areas may be cultivated if carefully constructed terraces are built and properly maintained. The more steeply sloping areas should be used for forest or planted to kudzu (pl. 4, *B*). The forested area, 89 percent of the total, grows principally shortleaf and loblolly pines, with some sweetgum, hickory, and various species of oak.

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MACON SERIES

The soil of the Macon series is closely associated with the Susquehanna and other soils in the Coastal Plain. It differs from them in having a brownish-gray to dark-gray surface soil and light brownish-gray to dark-brown stiff heavy clay upper subsoil underlain by an intensely mottled brown, yellow, light-gray, and red plastic lower subsoil. It is derived from beds of heavy clay. The relief ranges from undulating to gently sloping, and the surface drainage is fair to good, but internal drainage is slow. Macon very fine sandy loam, the only type mapped, is medium acid.

Macon very fine sandy loam.—Relatively large areas occur in the southern part of the county near Marvyn. A total of 1,408 acres is mapped on rather broad smooth interstream areas where the slopes are generally less than 3 percent. Short slopes or breaks adjacent to streams often approach a 6- or 7-percent gradient. Terraces may be necessary in places but are not required for soil conservation in most areas. Surface drainage is moderately rapid, and subsoil drainage is slow. This soil has the following profile characteristics:

0 to 4 inches, brownish-gray to dark-gray very fine sandy loam to mellow and friable fine sandy loam.
4 to 7 inches, light brownish-gray clay loam.
7 to 16 inches, dark-brown heavy tough clay faintly mottled with dark red and dull gray, with an olive-drab cast and somewhat plastic.
16 to 25 inches, dark-brown clay finely but abundantly mottled with dark red and dull gray, has drab cast, is somewhat plastic, and the intensity of gray increases with depth.
25 inches +, light-gray heavy plastic clay intensely mottled with yellow and brown.

This soil is relatively uniform, but in places the upper subsoil is yellow or yellowish brown rather than dark brown. It is closely associated with Marlboro sandy loam and Eutaw clay and grades into these two soils as well as into Susquehanna clay. A few small spots of these soils, particularly along the boundaries that cannot be shown separately, are included. The soil is medium acid.

Of the 69 percent in cultivation about two-thirds is cropped to cotton, which produces ¼ to ⅜ bale an acre where the soil is fertilized with 250 to 350 pounds of a 6–8–4 fertilizer or its equivalent. Corn yields 8 to 25 bushels when fertilized with 100 to 200 pounds of nitrate of soda; and oats, 10 to 35 bushels when fertilized with 100 to 175 pounds of nitrate of soda. This soil is well suited to pasture grasses, especially lespedeza, carpet grass, Dallis grass, hay, clover, and orchard grass. Excellent yields of sericea lespedeza are being produced on a similar soil at Tuskegee, Ala.

MADISON SERIES

The soil of the Madison series is closely associated with the Cecil and Louisa soils. It is developed from quartz mica schist and mica schist. The surface layer is brownish gray to pale brown with red moderately heavy but friable clay subsoil, which usually grades at a depth of 20 to 24 inches into a friable micaceous clay. The relief ranges from undulating to gently rolling, and surface and internal drainage are very good. In places sheet erosion has removed part of the original sandy surface soil and locally exposed the subsoil. Madison sandy loam, the only type mapped, is medium to strongly acid.

Madison sandy loam.—Areas of this soil are often irregular in shape, and after terracing the fields are generally small. Drainage is good to excessive, and runoff should be checked by well-constructed terraces. The soil covers a total of 4,032 acres on smoothly undulating ridge tops and gentle slopes where the gradient seldom exceeds 6 percent. The largest areas are concentrated to the north and northwest of Auburn and in the vicinities of Ridge Grove and Macon Mill; smaller areas are in the northeastern part of the county.

This type differs from Cecil sandy loam in that it is derived mainly from quartz mica schist and contains more mica flakes throughout the profile. As a result of erosion it has a spotted appearance caused by small irregular-shaped areas of grayish-brown sandy loam intricately intermixed with areas of clay loam. The spots having the sandy surface have a shiny appearance owing to considerable mica flakes mixed in the soil and on the surface. The profile is similar to that of the Cecil soils except for considerable quantities of mica that seem to have little influence on the physical condition until a depth of 18 to 22 inches is reached, where the material becomes much more loose and friable than normal for the Cecil soils. In cultivated areas it has the following profile characteristics:

0 to 5 inches, brownish-gray to pale-brown sandy loam. This layer has disappeared in many places.
5 to 20 inches, red moderately stiff but brittle clay breaking into irregular-shaped lumps that are easily broken down into a fine granular mass containing numerous small mica flakes.
20 to 40 inches, light-red friable clay containing a large quantity of small mica flakes that give it a greasy feel.
40 inches +, purplish-red soft disintegrated quartz mica schist.

About 60 percent of this soil is cleared and under cultivation or used for pasture. Cotton is planted to more than 50 percent of the area and yields ⅛ to ⅜ bale an acre where the soil is fertilized with 250 to 350 pounds of a 6–8–4 fertilizer or its equivalent. Oats are also well suited to this soil and yield 10 to 35 bushels when fertilized with 100 to 200 pounds of nitrate of soda. Under fair to good management corn yields 8 to 25 bushels when fertilized with 150 to 200 pounds of nitrate of soda or its equivalent. The use of winter cover crops is especially advantageous for the production of corn, as they add organic matter to the soil and also aid in erosion control and moisture conservation. Hay crops, as soybeans, cowpeas, common lespedeza, sericea lespedeza, kudzu, and others, may be grown satisfactorily.

In some places there is such a complex association of Madison and Cecil soils that they cannot be separated on the scale of mapping. A few small areas of Louisa clay loam too small to separate also are included.

MARLBORO SERIES

The soil of the Marlboro series, represented by Marlboro sandy loam, has somewhat the appearance of the Norfolk soils but differs from them in having a brownish-gray color in the surface layer, a shallower soil over a deep yellow or light brownish-yellow moderately heavy friable fine sandy clay subsoil, more fine material throughout both the soil and subsoil, and a heavier texture. It is developed from beds of sandy clay in the Coastal Plain and is closely associated with the Norfolk and Gilead soils. The surface is nearly flat to gently

undulating, both surface and internal drainage are good, and there is practically no erosion. The soil is medium to strongly acid.

Marlboro sandy loam.—The relief of this soil ranges from nearly flat to gently undulating, with an average slope of less than 4 percent. Slopes are sufficiently gradual and uniform so that erosion under a clean-cultivated cropping system can be held to a minimum with some terraces on the more sloping areas. This soil has developed from unconsolidated clay and sandy clay of the Coastal Plain region. Both internal and external water movement are sufficiently free to allow the soil to drain and warm early in spring so that all crops common to the area can be readily grown. It is one of the best soils for general farming purposes and can be built up to a high state of productivity. The largest areas are in the southern part of the county near Marvyn. A total of 1,408 acres is mapped. In cultivated areas this soil has the following profile characteristics:

0 to 6 inches, light brownish-gray to brownish-gray mellow and friable sandy loam.
6 to 32 inches, yellow to light yellowish-brown sandy clay or clay loam, firm but friable and crumbly and slightly sticky.
32 inches +, light-yellow slightly compact sandy clay streaked with red and brown.

This is one of the most uniform soils in the county, but as it grades into Macon very fine sandy loam, Norfolk sandy loam, Norfolk sandy loam, deep phase, and Gilead sandy loam, in some places, it necessarily contains small quantities of these soils that are too small to separate on the scale of mapping used.

The tilled areas, 94 percent of the total area, are used largely for cotton, corn, hay, and oats. Normally cotton yields ½ to more than 1 bale an acre where the soil is fertilized with 300 to 600 pounds of a 6–8–4 fertilizer. Corn and oats yield 15 to 35 bushels when fertilized with 150 to 225 pounds of nitrate of soda or when following a green-manure crop, as vetch, crimson clover, or Austrian peas. Peanuts, oats, soybeans, and cowpeas make correspondingly good yields.

MYATT SERIES

The surface soil of the Myatt series is dark gray, and the friable subsoil a light-gray mottled yellow and brown. Most of the surface is flat or almost level, and both the surface soil and subsoil are poorly drained. This soil occurs on second bottoms or terraces, usually along the larger streams, in close association with the Kalmia soils. The material from which it has developed was washed from soils in the Coastal Plain region and brought down by the streams when they flowed at higher levels. It is easily distinguished from the other soils on the terraces because of its poor drainage and dark-gray surface layer. Both surface soil and subsoil of Myatt sandy loam, the only type mapped, are strongly acid.

Myatt sandy loam.—This type, covering only 192 acres, occurs on nearly flat second bottoms or benchlike positions along the larger streams in the southern part, mostly near Hospilika Creek. It has the following profile characteristics:

0 to 6 inches, dark-gray sandy loam containing considerable organic matter.
6 to 25 inches, light-gray sandy loam to loamy sand mottled with some yellow and brown.

25 inches +, light-gray sandy clay mottled with yellow and brown; slightly plastic and grades into heavy plastic clay.

This soil is used almost entirely for pasture and timber. About 8 percent is sufficiently cleared to furnish fair pasture; the forested areas are in range land pasture. Carpet grass is about the only grass that can be relied upon for pasture purposes under current practices, but with improved practices, including the use of phosphate and lime or basic slag, Dallis grass, orchard grass, and white Dutch clover may be grown. The areas in forest support loblolly, shortleaf, and longleaf pines, sweetgum, black tupelo, red maple, water oak, bay trees, yellow-poplar, laurel oak, underbrush, vines, and briers.

In sec. 8, T. 17 N., R. 29 E., about 160 acres are mapped, most of which has a gray sandy loam surface layer 8 to 12 inches thick over heavy rather plastic dull-gray clay strongly mottled with bright red and brown. At a depth of about 20 inches it becomes light gray mottled with light brown and red. This would have been mapped as Leaf sandy loam had there been sufficient area to warrant separate recognition.

NORFOLK SERIES

The soils of the Norfolk series are widely distributed throughout the county in close association with the Ruston, Marlboro, and Gilead soils and are developed from beds of unconsolidated sand and sandy clay. The relief is nearly flat to sloping, and the soils are everywhere naturally well drained. The texture ranges from coarse sand to very fine sandy loam. The soils are strongly to moderately acid and are characterized by light brownish-gray or yellowish-gray surface soil, pale-yellow subsurface layer, and a light-yellow to light yellowish-brown friable sandy clay subsoil. Included in this series are areas of sand of variable texture. Types and phases mapped are Norfolk sandy loam and its sloping and deep phases, Norfolk loamy sand, and Norfolk sand and its sloping phase.

Norfolk loamy sand.—Areas of this soil are in the southern part of the county, the largest being near Beehive, Prince Crossroads, and to the south of Smiths Station. A total area of 1,984 acres is mapped. Since the slope seldom exceeds 4 percent and rainfall is absorbed rapidly, erosion is a minor problem. The greatest drawback to the soil is its sandy and porous character that allows rainwater to percolate through it rather rapidly and to remove a part of the soluble plant nutrients before the plants can utilize them. The supply of moisture is not sufficient for maximum yields of crops, although fair to good yields are obtained under good management.

Intermediate between Norfolk sandy loam and Norfolk sand this soil has more clay in the subsoil than Norfolk sand, but it does not have so much clay, and clay is not so near the surface as in Norfolk sandy loam. It has the following profile characteristics:

0 to 6 inches, light-gray to brownish-gray loamy sand.

6 to 36 inches, pale-yellow loose friable loamy sand containing only a small quantity of clay.

36 inches +, generally a firm, heavy, slightly compact sandy clay being, in places, somewhat similar to the subsoil of Gilead sandy loam. Occasionally it may be 4 or 5 feet deep before this layer is reached. In places the yellow friable sandy clay is at a depth of 30 to 36 inches.

About 85 percent of this soil is open for cultivation. Many areas are fallowed every 3 to 5 years to allow a growth of weeds and

lespedeza to be turned under. Cotton, corn, and soybeans are the chief crops. Cotton normally yields ¼ to ⅝ bale an acre when the land is fertilized with 250 to 400 pounds of a 6–8–4 fertilizer or its equivalent; corn 6 to 20 bushels when fertilized with 150 to 200 pounds of nitrate of soda or the equivalent; and soybeans ½ to 1 ton. Soybeans are not generally fertilized, but 200 to 400 pounds of basic slag or half of this quantity of superphosphate has been used by some farmers with profitable increases in yield. Peanuts, early vegetables, melons, sweetpotatoes, peaches, berries, velvetbeans, grapes, and oats also are well suited to this soil.

Large quantities of organic matter should be turned under each year, or at least in alternate years, to keep this soil in a moderately productive state, because leaching of plant nutrients and oxidation of organic matter are rapid. The organic matter aids in the retention of moisture, and it also supplies plant nutrients.

Small areas of Norfolk sand, Norfolk sandy loam, and Gilead sandy loam that cannot be separated on the map are included.

Norfolk sand.—The largest areas of this soil occur northeast of Marvyn and near and along the Russell County line. A total of 11,584 acres is mapped. The relief is undulating to gently sloping with rather broad gradual slopes, few of which are as much as 7 percent. Water readily penetrates the loose open soil, and erosion is not so serious as on some soils, but much of the soluble plant nutrients is leached out. This is the lightest textured soil of the uplands in the county. It has the following profile characteristics:

0 to 6 inches, light-gray or somewhat yellow loose incoherent sand.
6 to 36 inches, light grayish-yellow or pale-yellow incoherent sand.
36 to 44 inches, light-yellow loose sand.
44 inches +, hard to friable sandy clay. The depth to this sandy clay varies from 44 to 72 inches.

Occasionally small indeterminate areas of Gilead sandy loam occur in areas mapped as Norfolk sand, but as a rule this is a rather uniform soil.

Under careful management, fertilization, and crop rotations cotton, corn, oats, and hay produce fair to good yields. Because of the heavy sandy clay layer at a depth of 3½ to 5 feet this type is more productive than most Norfolk sand of the State. Cotton yields ⅛ to ½ bale an acre when the land is fertilized with 250 to 400 pounds of 6–8–4 or 4–8–4 fertilizers and top-dressed with 50 to 125 pounds of nitrate of soda; corn 10 to 25 bushels when fertilized with 100 to 200 pounds of nitrate of soda; and winter oats 10 to 25 bushels when top-dressed with 75 to 150 pounds of sodium nitrate. Growing peanuts is probably one of the best uses of this soil, and grapes, peaches, and figs are also well suited to it.

This soil is badly in need of organic matter. A winter cover crop, vetch or Austrian Winter peas, or a summer crop, especially crotalaria, is used advantageously by some farmers. The organic matter not only enriches the soil but also aids in the retention of moisture.

Norfolk sand, sloping phase.—Mapped in the county are 4,672 acres of this phase. The largest areas are in the south-central part near Whatley Crossroads, near Meadows Crossroads, and across the county boundary from Phenix City. This phase is intimately asso-

ciated with and related to Norfolk sand but occurs on steeper slopes usually over 7 percent though seldom exceeding 12 percent. The profile is essentially the same and is characterized by having 3 feet or more of sand surface over sandy clay. The soil is subject to gully erosion, but sheet erosion is of little consequence. In addition to this it is also subject to leaching of its soluble plant nutrients. As it is almost impossible to carry over a great deal of plant nutrients from year to year, it is necessary to fertilize this soil rather liberally annually in order to produce economical yields. The use of cover crops is probably the most satisfactory method of increasing crop yields.

About 33 percent is open land. Crop yields are generally low. Cotton produces ⅛ to ⅖ bale an acre when fertilized with 250 to 350 pounds of a 6–8–4 fertilizer or its equivalent; and corn 7 to 20 bushels when following a winter cover crop. These yields are much higher than those usually obtained. Peanuts make satisfactory yields and are probably better suited to this soil than any other crop. Grapes, figs, and peaches also are well suited to this soil.

Included with this phase are a few areas of Norfolk loamy sand and also a few small areas of Norfolk sandy loam. These areas are too small to delineate on the map.

Norfolk sandy loam.—This soil, closely associated with Ruston and Orangeburg soils, is one of the most widely used and desirable soils of the county. It has a gray sandy surface soil and a yellow friable sandy clay subsoil. It is similar to Marlboro sandy loam, but the latter is a little heavier in both the surface soil and the subsoil. This soil is sufficiently loose and open to permit free root and water penetration and at the same time hold sufficient plant nutrients and moisture for average to good crop yields.

Surface relief ranges from nearly flat to undulating, with long smooth gradual slopes that are less than 6 percent in gradient. While terracing is needed on the more sloping areas, large numbers of terraces are not necessary to control erosion. All areas have good external and internal drainage. Most of the soil occurs in the southwestern and southern parts of the county, and other areas are near Roxana. A total area of 6,976 acres is mapped. It has the following profile characteristics:

0 to 7 inches, brownish-gray to yellowish-gray loamy sand or light-textured sandy loam.
7 to 12 inches, yellowish-gray to light-yellow loamy sand or light-textured sandy loam.
12 to 18 inches, yellow mellow and friable sandy loam.
18 to 30 inches, yellow to light yellowish-brown friable sandy clay.
30 inches +, yellow slightly compact sandy clay streaked with yellow and reddish brown, readily penetrated by water and roots, and readily crumbling when removed from place. All layers are strongly acid.

About 90 percent of the soil is open for cultivation with more than 50 percent planted to cotton (pl. 3, *B*), the rest in corn, hay, and oats. Under good management cotton yields ½ to more than 1 bale an acre when the land is fertilized with 300 to 600 pounds of a 6–8–4 fertilizer, corn 15 to 40 bushels when fertilized with 200 to 225 pounds of nitrate of soda in rotation with cotton or when following a winter cover crop that has been turned under. Soybeans, oats, cowpeas, peanuts, sweetpotatoes, and garden vegetables make good yields under good management. This soil, as well as all members of the Norfolk series, is easy

to till under a wide range of moisture conditions, warms early in spring, and responds readily to fertilization.

Included with this soil are areas of Norfolk fine sandy loam that have a fine sandy loam soil and subsoil. These areas are in the vicinity of Union Crossroads in the southern part of the county. In addition areas of Norfolk sandy loam, deep phase, Gilead sandy loam, and Chesterfield sandy loam too small to delineate on the map are included. Some areas contain a considerable quantity of small rounded quartz gravel ⅛ to 1 inch in diameter; these areas are indicated by gravel symbols. All the above included areas have essentially the same type of agricultural adaptation and produce yields comparable to Norfolk sandy loam.

Norfolk sandy loam, deep phase.—Relatively large but scattered areas of this phase occur in the southern part of the county from Loachapoka in the western part to Meadows Crossroads in the southeastern part. A total of 10,112 acres is mapped on fairly broad ridge tops with gradually sloping sides that seldom exceed 6 percent gradient. Generally the soil can be terraced efficiently with a small enough number of terraces so as not to interfere seriously with tillage operations by heavier types of machinery. It is, however, important to keep the more sloping areas well terraced or erosion losses will be excessive. Power machinery may be used rather satisfactorily on most areas. Drainage is good, and cultivation can usually be resumed soon after rains without injurious effects. The soil warms early in spring, it is very easy to till, and responds to treatment similar to that recommended for the sandy loam.

This soil is closely associated with Norfolk loamy sand, Norfolk sandy loam, and Gilead sandy loam and its eroded phase and often contains small areas of these soils, especially where it grades into them. It differs from the Norfolk sandy loam chiefly in that its sandy covering is 6 to 18 inches deeper over sandy clay. In the main, it has the following profile characteristics:

0 to 8 inches, light-gray loamy sand.
8 to 24 inches, yellowish-gray to pale-yellow loamy sand.
24 to 36 inches, light-yellow or light yellowish-brown sandy loam grading into yellow friable sandy clay.
36 inches +, slightly compact friable sandy clay mottled red and brown and light gray.

About 89 percent of this phase is under cultivation, with approximately 50 percent planted to cotton, 20 percent to corn, and the rest to cowpeas, soybeans, hay, oats, and pasture. Yields are slightly lower than on Norfolk sandy loam, but with good management good to excellent yields are obtained. Cotton yields ⅛ to ⅜ bale an acre when the land is fertilized with 300 to 500 pounds of a 6–8–4 fertilizer or its equivalent; corn, 10 to 30 bushels when fertilized with 100 to 225 pounds of nitrate of soda following a heavily fertilized cotton crop or when following a winter cover crop; oats, about the same as corn when fertilized with 100 to 200 pounds of nitrate of soda. Peanuts, sweetpotatoes, garden vegetables, and hay crops produce well.

Norfolk sandy loam, sloping phase.—Areas of this phase are small and occur principally in the south-central and southeastern parts of the county. A total of 320 acres is mapped, the largest area being in Marvyn. Well-constructed and well laid-out terraces are essential

to the control of runoff and erosion in clean-cultivated fields. The irregular-shaped fields, made necessary by terraces and contour farming, make this soil unsuited to heavy farm machinery. Some unterraced fields are badly eroded.

This phase differs essentially from Norfolk sandy loam in that it occurs on a more sloping relief, 7 to 12 percent, drainage is more excessive, and terracing is more necessary. It has the following profile characteristics:

0 to 5 inches, brownish-gray loamy sand.
5 to 11 inches, light-gray loamy sand or light-textured sandy loam.
11 to 16 inches, yellow friable sandy loam.
16 to 30 inches, yellow to light yellowish-brown friable sandy clay.
30 inches +, yellow brittle sandy clay streaked with gray and reddish brown.

Practically all of this land has been farmed at one time but now approximately 55 percent of it is in timber, mainly shortleaf and loblolly pines, and the rest is planted to cotton, which yields ¼ to ⅜ bale an acre depending on quantity and quality of commercial fertilizer applied. This soil is suited to general farm crops and perennial hay crops. A hay mower can be used on most areas satisfactorily.

Included on the map are a few small areas resembling Ruston sandy loam and Norfolk fine sandy loam.

PLUMMER SERIES

The soil of the Plummer series—Plummer sandy loam—is widely distributed in the Atlantic Coastal Plain and occupies poorly drained situations on the lower lying slopes, flats, and depressions in areas of Norfolk, Ruston, Gilead, and associated soils. It is developed from beds of unconsolidated sand and sandy clay, but because of poor drainage the surface is medium gray, and the subsoil is mottled yellowish gray and yellowish brown. The texture ranges from sand to fine sandy loam. In addition to the native trees, the characteristic vegetation in many places includes pitcherplant and gallberry bushes. Both the surface soil and subsoil are very strongly acid.

Plummer sandy loam.—During much of the year this soil is too wet for cultivated crops unless artifically drained. It occurs in basins or on gentle slopes where the relief is 1 to 3 percent or on benchlike positions, principally northwest of Hopewell Church, west of Little Uchee Creek, and about 4 miles northwest of Phenix City (Russell County), A total of 896 acres is mapped. This soil has the following profile characteristics:

0 to 7 inches, medium-gray sandy loam fairly high in organic matter.
7 to 18 inches, light-gray sand or loamy sand.
18 to 30 inches, heavy sandy clay mottled gray, red, and brown.
30 inches +, heavy gray clay containing some mottlings of yellow and brown.

This soil often occurs at the head of small draws, and locally small spots have been ditched and are used for sorghum cane, soybeans, lespedeza, or corn. Most of the areas support largely gallberry bushes and sweetgum with some shortleaf and loblolly pines in the better drained positions around the edges. Some carpet grass grows around the edges and furnishes pasture. When cleared and drained the soil produces good yields of sorghum and an excellent quality of cane for sirup.

RUSTON SERIES

The soil of the Ruston series, occurring in close association with the Norfolk soils, has a brownish-gray to light yellowish-brown surface soil and yellowish-brown to reddish-brown friable sandy clay or sandy subsoil. The sandy clay from which it has developed is similar to the parent material under the Norfolk. In relief this series ranges from almost level or undulating to gently sloping and is everywhere well to excessively drained. Ruston sandy loam, the only type mapped, is medium to strongly acid.

Ruston sandy loam.—Though small in extent (896 acres), this is an important agricultural soil. It is easily tilled, responsive to good soil improvement practices, including terracing, and well suited to all locally grown crops. The relief is undulating to gently sloping with the steepest slopes being less than 6 percent. Most of the soil requires some terraces to prevent erosion and too rapid runoff. Drainage, both internal and external, is good in all areas.

Relatively small scattered areas occur in the southern and southeastern parts of the county. The largest ones are near Roxana, Griffin Mill, Beehive, northeast of Phenix City, and ½ mile south of Union Crossroads. This soil has the following profile characteristics:

0 to 7 inches, brownish-gray loamy sand to sandy loam.
7 to 10 inches, light yellowish-brown loamy sand to sandy loam.
10 to 15 inches, yellowish-brown friable heavy sandy loam or sandy clay.
15 to 36 inches, pale reddish-brown friable sandy clay.
36 inches, streaked, mottled, and mixed reddish-brown, yellow, and gray, slightly compact brittle sandy clay.

About 90 percent of the soil is cultivated to cotton, corn, and hay. Cotton predominates and yields ½ to ¾ bale an acre when the land is fertilized with 300 to 600 pounds of a 6–8–4 fertilizer. Corn yields 15 to 40 bushels when side-dressed with 100 to 200 pounds of nitrate of soda, and more than 30 bushels is consistently obtained when corn follows a winter cover crop or when it is used in rotation with cotton and fertilized with 200 to 225 pounds of nitrate of soda. Soybeans and other locally grown hay crops produce 1 to 1½ tons of hay. Oats yield about the same as corn under similar fertilization. Certain areas may be found to be run down and unproductive. A well-managed soil-improvement program can be expected to build up such areas to a fair to high state of productivity. The recommendation for the Norfolk sandy loam will apply equally well for this soil.

As this soil occurs in close association with the Norfolk and Chesterfield sandy loams, small areas of each are often included in mapping. In secs. 27, 28, 33, and 34, T. 18 N., R. 30 E., an area is also included that has a heavier and redder subsoil than that which characterizes this type. Owing to its similarity in color, position, topography, drainage, crop adaptation, and yields, it was included on the map as Ruston sandy loam. A few areas have considerable small rounded gravel scattered over the surface that does not seriously affect cultivation; these are indicated on the soil map by gravel symbols.

STARR SERIES

The soil of the Starr series is composed of materials that have washed, rolled, or sloughed down from areas of Cecil, Appling, Davidson, Lloyd, and Louisa soils and accumulated at the base of slopes,

in depressions, and on the flats bordering the slopes. It is brown to reddish brown throughout the profile and is moderately mellow and friable. The relief is almost level to gently sloping, and the soil is naturally well drained. Starr loam, the only type mapped, is medium to strongly acid.

Starr loam.—Although this soil is not subject to overflow, considerable water may run over it during heavy rains. Drainage ditches, however, can generally remove the water before serious damage is done to growing crops. The soil occurs at the head of shallow draws, in depressions, and at the base of slopes and consists of 12 to 24 inches of material washed from the surrounding upland soils. Many small usually irregular-shaped areas are scattered over the northern part of the county, particularly in the northeast and east-central parts. The total of 1,024 acres is mapped in association with Davidson, Lloyd, Cecil, Madison, and Louisa soils.

The surface soil is brown to reddish-brown loam, sandy loam, or clay loam 4 to 6 inches thick and generally fairly high in organic matter. At a depth of 12 to 24 inches or more the underlying material that has been buried by the overwash is usually much the same in color and varies from sandy loam to clay loam. The type of material varies from place to place according to the surrounding upland soil.

About 53 percent of this soil is in cultivation and used largely for corn and hay crops with cotton on some areas. It is one of the strongest soils in the county and produces excellent yields of all locally grown crops. As it is well suited to Dallis grass, white Dutch clover, lespedeza, and hop clover excellent pasture can also be developed. Corn yields 12 to 40 bushels an acre, oats 15 to 45 bushels, soybeans or lespedeza 1 to 2 tons of hay, and cotton ½ to 1 bale. Very little fertilizer is used for most crops except cotton; that is generally fertilized with 200 to 300 pounds of a 3–8–5 or 6–8–4 fertilizer.

SUSQUEHANNA SERIES

The soils of the Susquehanna series are characterized by light-gray or yellowish-gray fine sandy loam or reddish-brown clay loam surface soils and mottled light-red, yellow, and light-gray very heavy plastic clay subsoils. Since these soils are developed from heavy acid clay, they are strongly acid. They occur in close association with soils that have more uniformly and better colored subsoils. The relief ranges from gently to steeply sloping and hilly; both sheet and gully erosion are severe on clean-cultivated areas. Surface drainage is good, but internal drainage is very slow. Susquehanna clay and its sloping phase and Susquehanna fine sandy loam are mapped.

Susquehanna clay.—This soil occurs on a gently sloping to sloping relief of less than 7-percent gradient. The relief coupled with the slow water absorption of the subsoil makes the soil subject to erosion when cultivated. The only area mapped, occupying 192 acres, is about 1½ miles southeast of Marvyn.

This heavy red to brownish-red clay is very sticky when wet and checks and cracks when dry. A covering of fine sand 1 to 5 inches

thick occurs over some areas. This soil has the following profile characteristics under timbered conditions:

0 to 1 inch, leafmold and organic matter; some fine sand may be present.
1 to 10 inches, yellowish-gray heavy plastic clay.
10 to 30 inches, intensely mottled light-gray, light-red, and yellow heavy plastic clay.
30 inches +, light-gray heavy plastic clay mottled with some yellow and brown.

This soil is best suited to pasture and forest. Most of the area is in woodland growing shortleaf, loblolly, and longleaf pines, sweetgum, and some post oak. For pasture purposes it is best adapted to lespedeza, Dallis grass, and carpet grass and experiments indicate that it is especially well suited to sericea lespedeza.

A few small areas of Susquehanna fine sandy loam and Gilead sandy loam are included in mapping.

Susquehanna clay, sloping phase.—This phase occurs on a more sloping to rolling relief than the associated Susquehanna clay and is recognized as hilly red sticky clay land. The normal relief ranges from 7 to 12 percent and is chiefly sloping, causing erosion to be severe under cultivated conditions. The largest areas are along and east of Odom Creek. A total of 1,088 acres is mapped. This soil has the following profile characteristics:

0 to 4 inches, reddish-brown heavy plastic clay loam to clay.
4 to 15 inches, red to yellowish-red plastic clay with faint-gray and yellow mottlings.
15 to 30 inches, mottled red, gray, and yellow heavy plastic clay.
30 inches +, gray plastic clay mottled red, brown, and yellow.

Nearly all this land has been under cultivation at one time or another but it has become so unproductive and badly eroded that only about 24 percent is now open land. Probably less than 10 percent of the total area is cultivated annually, as many open areas are idle or used for pasture. Pasture is fair for 2 or 3 months in spring. Carpet grass and lespedeza are especially well adapted and supply most of the grazing. The greater part of this soil is in forest and is especially well suited to shortleaf, longleaf, and loblolly pines and to post, blackjack, and other oaks.

Occasional spots of Susquehanna fine sandy loam and other associated soils, as Cuthbert and Gilead, are included in mapping.

Susquehanna fine sandy loam.—Most of the 320 acres of this type is southeast of Marvyn and Chewacla State Park, on undulating to gently sloping relief. The greatest slopes seldom exceed 6 percent but the undulating topography together with the slowly pervious character of the subsoil causes rapid runoff and severe sheet and gully erosion. Tillage operations are a problem, as the soil must be farmed when the moisture condition is just right. When too wet it is sticky and difficult to plow, and when dry it bakes and breaks into hard clods. The areas are generally shaped conveniently for terracing and general farming, and most types of machinery can be used on most areas. Surface runoff is good to rapid, whereas internal drainage is slow. Terracing is helpful in practically all locations. Both surface soil and subsoil are strongly acid.

This type has a gray surface soil and a sticky, plastic, mottled subsoil. The profile characteristics are as follows:

0 to 4 inches, yellowish-gray fine sandy loam.
4 to 6 inches, yellowish-gray fine sandy clay loam.
6 to 15 inches, red to yellowish-red heavy plastic clay containing some faint-gray and yellow mottlings.
15 to 30 inches, yellowish-brown heavy plastic clay mottled with red, gray, and yellow, the gray increasing with depth.

When removed from a cut surface this material falls into blocks ½ to 1 inch on a side coated with yellowish-brown colloidal material. When crushed the material is mottled gray, yellowish-gray, bright-red, and brown clay. Below this is mottled bright-red, brown, and yellow massive clay to sandy clay. The subsoil is plastic, but this lower layer is less plastic and more sandy and grades into slightly weathered beds of unconsolidated clay.

About 50 percent of the soil is open for cultivation, and the rest is used for forest and woodland pasture. The tilled areas normally produce low yields. Cotton and oats are the best adapted crops, but corn and hay make fair yields under good management. Fair pasture of Dallis grass, carpet grass, lespedeza, hop clover, and orchard grass may be grown. The land is better suited to grazing than cultivated crops, as cotton and grains. In addition, it is also well suited to sorghum for ensilage purposes. Cotton yields ¼ to ½ bale if the soil is fertilized with 150 to 350 pounds of a 6–8–4 fertilizer or its equivalent, oats 10 to 30 bushels; and corn 5 to 20 when fertilized with 100 to 200 pounds of nitrate of soda. Best yields of corn are obtained following a winter cover crop. The use of 500 to 1,000 pounds of basic slag an acre is beneficial for pasture grasses. Sericea lespedeza is well suited to this soil. The forested areas grow principally shortleaf and loblolly pines, sweetgum, and a few scrub oaks.

Occasional areas are included in mapping where the sandy surface has eroded away leaving red clay exposed. Some small indeterminate areas of Gilead soils also are included.

WILKES SERIES

The Wilkes series is on extremely broken and hilly relief. In many places there is only a shallow covering of soil of varying texture over a thin layer of yellowish-brown subsoil or soft disintegrated rock. The soil is made up largely of small areas more or less severely eroded. The underlying rocks are granite, gneiss, and diorite cut by dikes of dark-colored basic rocks. Erosion has been active and in places has cut down to the rather hard bedrock. Surface drainage is good to excessive. The soil ranges from slightly to strongly acid. Only one type—Wilkes sandy loam—is mapped.

Wilkes sandy loam.—This type is variable in color, texture, structure, and depth over rock. The relief is strongly sloping to hilly and broken, with a usual slope of 10 to 20 percent. Large bodies are located 4 miles north of Phenix City, 3 to 7 miles north of Smiths Station, 3 miles southwest of Bleecker, and 1 mile northwest of Meadows Crossroads. Other scattered areas occur in the north-central part of the county. A total of 10,176 acres is mapped.

To a depth of 3 or 4 inches the surface soil is gray to dark-gray sandy loam or fine sandy loam underlain by 10 to 15 inches of yellowish-

gray sandy loam or clay loam. In some places a yellowish-brown clay subsoil a few inches thick grades into rotten granite or mixed granite and diorite rock at a depth of 18 to 24 inches. The more normal subsoil occurs at a depth of 10 to 18 inches and is yellowish-gray slightly mottled or streaked brown heavy fine sandy clay or stiff heavy impervious clay grading into rotten rock material. Generally this rock material is granitic but frequent spots of basic or diorite rock material are present. Stones are numerous on the surface, and bedrock is near the surface.

About 3 percent of this soil is under cultivation, but crop yields are low and areas are irregular in shape, very erosive, and difficult to farm except by one-horse plows. These cleared areas are probably better suited to kudzu than to any other cultivated crop. The best use for this soil is forestry, and the trees commonly present are shortleaf and loblolly pines, sweetgum, and various oaks.

Near Goat Rock Dam are areas of sloping to broken Iredell soils developed from diorite rock that are included on the map with this type.

WORSHAM SERIES

The soil of the Worsham series occurs in the Piedmont province in close association with the Cecil, Appling, Durham, and other soils of the uplands. It is in small areas and at the base of the slopes bordering or contiguous to the heads of streams and around intermittent drainageways. The soil has light-gray to dark-gray surface soil and mottled light-gray, yellow, or brown heavy medium plastic clay subsoil. It is wet the greater part of the time because of the seepage water from higher soils. The surface is very gently sloping to sloping. Locally some gullies have developed. This soil, represented by Worsham sandy loam, is strongly acid.

Worsham sandy loam.—This white or light-gray poorly drained soil of the Piedmont province occurs on slopes of 1 to 3 percent around draw heads and at the foot of slopes toward streams. In some locations the areas are saucerlike, and water is more or less impounded for periods of time. In the main, however, the areas are on gradual slopes. Surface drainage is imperfect, but internal drainage is poor because of the heavy nature of the subsoil and substratum. This soil receives seepage water from the higher lying soils and is generally too wet to be farmed. It covers a total area of 1,664 acres and occurs chiefly as small irregular-shaped areas scattered over the northern part of the county. Some of the larger areas are south of Powledge and in the vicinity of Bleecker. It has the following profile characteristics:

0 to 5 inches, light-gray to dark-gray sandy loam. In places an accumulation of 1 to 2 inches of organic matter is present.
5 inches +, light-gray to nearly white, tough, slightly plastic clay mottled with gray and yellow.

At a depth of 3 or 4 feet the subsoil grades into gray soft disintegrated rock. In places there is a thin covering of brown loam or sandy loam recently deposited over the original soil.

About 11 percent of the total area is open land, either cultivated or in pasture. Occasionally very small spots occur on edges of fields and in positions where drainage is fairly good. When drained, this

soil produces good carpet grass pasture or oats. Dallis grass may produce excellent pasture if carpet grass is held in check and the areas are fertilized with phosphate and lime. Sirup made from sorghum grown on this soil is bright in color and of excellent quality. Sorghum produces an abundance of ensilage on areas of this soil. Some corn is grown on the better drained areas, and fair to good yields are obtained. The forested areas produce, principally, sweetgum, black tupelo, scrub oak, and some shortleaf and loblolly pines.

PRODUCTIVITY RATINGS

In table 6 the soils of Lee County are listed alphabetically, and estimated average acre yields of the principal crops are given for each soil under both current practices and more intensive practices of management.

The estimates in column A under each crop indicate yields obtained under current practices, which on most farms consist of an application of 200 to 300 pounds of complete fertilizer (6–8–4, 3–8–5, or 4–8–4) to cotton, 100 to 150 pounds of nitrate of soda to corn and oats with no fertilizer for hay or soybeans. No fertilizer is used on soils of the alluvial bottoms. Systematic rotations are not generally used, though crops are sometimes changed every year or two. Cover crops and legumes are not commonly grown.

The estimates in column B under each crop indicate yields obtained or to be expected under more intensive management practices in which larger and more frequent applications of lime, phosphate, and complete fertilizer are used. This type of practice includes applications of 400 to 600 pounds of complete fertilizer to cotton, 2 to 3 tons of lime an acre preceding legume crops, and 150 to 300 pounds of nitrate of soda to corn and oats. It also includes systematic rotations and growing winter cover crops of legumes or small grains and the use of contour farming and strip cropping where needed to control runoff and erosion.

The estimates in table 6 are based primarily on interviews with farmers, the county agricultural agent, members of the State experiment station and College of Agriculture staff, and others who have had experience in the agriculture of the county. These figures are presented only as estimates of the average production over a period of years according to the two general levels of management as broadly defined. It is realized that they may not apply directly to specific tracts of land for any particular year, as the fertility level of the soils shown on the map may vary somewhat from place to place, management practices differ slightly from farm to farm, and climatic conditions fluctuate from year to year. On the other hand, these estimates appear to be as accurate as can be obtained without further detailed and lengthy investigations, and they serve to bring out the relative productivity of the soils shown on the map.

In order to compare directly the yields obtained in Lee County with those obtained in other parts of the country, yield figures have been converted in table 7 to indexes based on standard yields. The soils are listed in the approximate order of their general productivity under prevailing practices (columns A), the most productive at the head of the table.

TABLE 7.—*Productivity ratings of the soils of Lee County, Ala., under prevailing farming pract*

[Indexes in columns A based on yields commonly obtained under current practices; those in columns B on yields commonly ob

Soils [1]	Crop productivity index [2] for—													
	Cotton lint (100=400 lb.)		Corn (100=50 bu.)		Winter oats (100=50 bu.)		Soybean hay (100=2½ tons)		Peanuts (100=1,200 lb.)		Sugarcane sirup (100=300 gal.)		Sorghum (silage) (100=12 tons)	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Marlboro sandy loam	62	125	30	70	40	80	40	60	67	125	50	58	83	125
Norfolk sandy loam	62	125	30	70	40	80	40	60	67	125	50	58	83	125
Ruston sandy loam	62	125	30	70	40	80	40	60	67	125	50	58	83	125
Chesterfield sandy loam, deep phase	62	125	30	70	40	80	40	60	58	100	50	58	83	125
Hiwassee fine sandy loam	62	125	30	70	40	100	40	60	58	100	[3] 50	58	83	125
Lloyd sandy loam	62	125	30	70	40	100	40	60	58	100	[3] 50	58	83	125
Cecil sandy loam	62	125	30	70	40	80	40	60	58	100	[3] 50	58	83	125
Starr loam	62	125	30	80	40	100	40	80	----	----	58	75	125	167
Durham sandy loam	50	94	30	70	40	80	40	60	58	100	50	58	83	125
Kalmia sandy loam	50	80	20	50	20	50	30	60	58	100	50	58	83	125
Norfolk sandy loam, deep phase	50	88	20	60	20	60	30	60	50	92	50	58	83	125
Davidson clay loam	50	88	20	50	40	100	30	60	17	33	[3] 50	58	83	125
Cecil sandy loam, eroded phase	44	81	20	50	30	70	30	60	42	75	42	50	67	117
Madison sandy loam	44	75	20	50	20	70	30	60	42	75	[3] 42	50	67	117
Congaree silt loam	----	----	40	100	[4] 40	70	40	60	----	----	[3] 58	75	100	167
Norfolk sandy loam, sloping phase	31	75	20	50	30	50	20	40	50	83	33	45	67	117
Bradley sandy loam	31	75	20	50	30	70	20	40	42	67	42	50	67	117
Gilead sandy loam	31	75	20	50	30	60	20	40	42	67	30	42	67	117
Macon very fine sandy loam	31	75	16	40	20	70	30	60	58	83	42	50	83	125
Appling sandy loam	31	75	20	50	30	60	20	40	58	100	30	42	58	100
Altavista sandy loam	31	75	20	50	30	70	20	40	42	67	42	50	67	125
Flint sandy loam	31	75	16	40	20	50	20	40	42	67	30	42	67	117
Davidson clay loam, rolling phase	31	63	16	40	20	60	20	40	17	33	----	----	50	100
Norfolk loamy sand	31	75	12	40	20	60	20	40	42	83	30	42	50	100
Herndon fine sandy loam	31	75	20	40	20	50	----	----	25	50	30	42	50	100
Cecil clay loam	31	75	16	40	20	70	20	40	42	67	[3] 30	42	67	117
Iuka silt loam (better drained areas)	----	----	[5] 30	60	[4] 30	60	[5] 40	80	----	----	[5] 58	75	[5] 100	167
Georgeville silty clay loam	31	63	10	40	20	70	20	40	42	83	30	37	67	117
Helena sandy loam	31	63	10	40	16	50	20	40	42	67	30	37	67	125
Cecil sandy loam, eroded rolling phase	31	63	16	40	20	50	20	40	33	58	[3] 25	33	50	92

Norfolk sand	31	63	10	40	16	50	20	30	33	58	20	30	50	100
Chewacla silt loam			[5] 30	60	[4] 20	60	[5] 40	80			53	70	100	67
Congaree sandy loam			30	70	[4] 40	80	40	60			[3] 58	75	83	125
Chesterfield sandy loam, sloping phase	31	50	10	30	20	50	20	40	33	58	22	30	42	83
Gilead sandy loam, eroded phase	31	63	10	40	20	50	20	40	33	58	20	30	42	83
Eroded sloping phase	31	63	10	40	10	40	20	40	33	58	25	37	50	100
Chesterfield sandy loam	31	63	10	40	20	50	20	40	33	58	20	30	42	83
Alluvial soils (Wehadkee soil material)			[5] 30	60	[5] 30	60	[5] 40	80			[5] 50	67	[5] 83	150
Louisa sandy loam, eroded rolling phase	31	50	10	30	16	40	20	40	25	50			42	83
Bradley sandy loam, sloping phase	31	63	16	40	20	50	20	40			[3] 25	33	50	92
Susquehanna fine sandy loam	31	63	10	40	20	60	20	40			30	37	67	125
Appling sandy loam, rolling phase	31	63	10	40	20	60	20	40			25	33	58	100
Gilead-Susquehanna sandy loams, eroded sloping phases.	31	63	10	30	10	40	20	40	25	50	20	30	42	83
Cecil clay loam, rolling phase	31	63	10	40	16	50	20	40					50	100
Louisa clay loam	31	63	10	30	16	40	20	40					42	83
Norfolk sand, sloping phase	25	50	10	40	10	50	20	40	25	50	20	30	42	83
Lloyd stony loam, rolling phase	31	63	16	40										
Iredell loam	25	50	10	40	20	60	30	60			30	47	67	125
Lloyd clay loam, rolling phase	31	63	10	40	16	50								
Louisa clay loam, rolling phase	25	50	10	40	16	40	10	20					42	83
Susquehanna clay, sloping phase	25	44			16	40	13	26			30	47	58	117
Goldston slaty loam	25	63	16	40										
Worsham sandy loam			10	40	20	50	[5] 30	60			50	67	83	125
Alluvial soils (Bibb soil material)			[5] 20	60			[5] 30	60			[5] 50	58	[5] 100	167
Myatt sandy loam					20	50	[5] 30	60			[5] 50	58	[5] 100	167
Grady sandy loam					20	50	[5] 30	60			[5] 50	58	[5] 100	167
Eutaw clay					20	50	30	60			50	58	83	133
Bibb silt loam							[5] 30	60			[5] 50	58	[5] 100	167
Plummer sandy loam							[5] 30	60			[5] 50	58	[5] 100	167
Susquehanna clay														
Cecil clay loam, hilly phase														
Guin sandy loam, steep phase														
Wilkes sandy loam														
Edgemont stony loam														
Steep phase														

[1] Soils are listed in approximate order of their general productivity under current practices.

[2] Soils are given indexes that indicate the approximate average production of each crop in percentage of the standard of re
acre yield obtained without the use of amendments on the more extensive and better soil types of those regions of the United Sta

[3] Sirup produced is dark in color and strong.

[4] Soil is poor for winter oats but fairly dependable for spring oats, although yields are not so great as for winter oats.

[5] Indexes based on yields obtained in small, better drained situations but not applicable to the soil as a whole.

The rating compares the productivity of each of the soils for each crop to a standard of 100. This standard index represents the approximate average acre yield obtained without the use of amendments on the more extensive and better soil types of the region of the United States in which the crop is most widely grown. An index of 50 indicates that the soil is about half as productive for the specified crop as is the soil with the standard index. The standard yield for each crop is given at the head of each respective column. Soils given amendments, as lime and commercial fertilizer, or special practices, as irrigation, and unusually productive soils of small extent may have productivity indexes of more than 100 for some or all crops commonly grown in the area.

Since it is difficult to measure either the exact significance of a crop in the agriculture of an area or the importance or suitability of certain soils for particular crops, too much significance should not be given to the precise order in which each soil is listed. The arrangement, however, does give information as to the general productivity of the soils.

The principal factors affecting the productivity of land are climate, soil (this includes the many physical, chemical, and biological characteristics), slope, drainage, and management, including the use of amendments. No one of these factors operates separately from the others, although some one may dominate. The factors listed may be grouped simply as the soil factor and the management factor. Slope, drainage, and most of the aspects of climate may be considered characteristics of a given soil type since the soil type, as such, occupies specific geographic areas characterized by a given range of slope and climatic conditions. Crop yields over a long period of years furnish the best available summation of the associated factors, and therefore, are used where available.

Productivity tables do not present the relative roles that soil types, because of their extent and the pattern of their distribution, play in the agriculture of the county. The tables show the relative productivity of individual soils according to designated generalized levels of management. They cannot picture in a given county the total quantitative production of crops by soil areas without the additional knowledge of the acreage of the individual soil types used for each of the specified crops.

Economic considerations play no part in determining the crop productivity indexes. They cannot be interpreted, therefore, into land values except in a very general way. Distance to market and other costs of production, relative prices of farm products, and other factors influence the value of land. It is important to realize that productivity as measured by yields is not the only consideration that determines the relative worth of a soil for growing crops. The ease or difficulty of tillage and the ease or difficulty with which productivity is maintained are examples of considerations other than productivity that influence the general suitability of a soil for agricultural use. In turn, steepness of slope, presence or absence of stone, resistance to tillage offered by the soil because of its consistence or structure, and the size and shape of areas are characteristics of soils that affect the relative ease with which they can be tilled. Likewise, inherent fertility and susceptibility to erosion are characteristics

that influence the ease of maintaining soil productivity at a given level.

Productivity as measured by yields is influenced to some degree by all these and other factors, as moisture-holding capacity of the soil and its permeability to roots and water, and so they are not factors to be considered entirely separately from productivity. On the other hand, schemes of land classification to designate the relative suitability of land for agricultural use must give some recognition to such factors.

LAND USE AND SOIL MANAGEMENT

Proper use of land is a basic problem in the agriculture of the county. Although other factors exist, the physical character of the land, including its chemical and biological aspects, largely determines its crop adaptation, response to tillage practices, and fertilizers, conservation requirements, and many other land uses. Social and economic conditions change, but the character of the soil and the lay of the land, or relief, are essentially permanent factors except where changes occur through accelerated erosion or overflow. In the section on Soils, the various soils and phases are described and their use and potential significance to agriculture are discussed. The estimated crop yields are given in the section on Productivity Ratings.

Use of the land in the past was guided by considerable regard for the physical character of the land; but wrong use has been too frequent. An example of misuse of land is the cultivation of areas that are severely eroded or on steep to hilly relief. Not all the land now in crops is naturally adapted to them from the point of view of permanent land use. On the other hand, part of the land now used as pasture and some in forest are physically adapted to growing cultivated crops.

Specific recommendations for land use and soil management on individual farms can ordinarily be made only after full consideration of the physical character of the land and the surrounding social and economic conditions. Soil management, however, can be discussed in a general way in relation to the physical character and the management needs of the various soil types and phases. One of the principal needs of the soils is a larger supply of organic matter. Winter cover crops are needed to conserve soil, water, and plant nutrients.

Although each soil separation mapped has its individual characteristics as regards land use and capability for crop production, for convenience the soils are placed in a small number of groups in which the members of each group are comparatively closely related as regards their management requirements based on soil characteristics. All the soil types and phases are placed in 8 groups. The soils of each group are so closely related in physical characteristics that they are expected to have essentially the same crop adaptation and to respond rather similarly to given practices of management, including fertilization. Conversely, the soils of the different groups may have the same crop adaptation but are not expected to respond in the same degree to a given management or fertilizer practice. Most of the soils are capable of being built up to a fair or even high state of productivity.

GROUP 1

The soils of group 1 constitute 58,304 acres with 78 percent open for cultivation. They are the most friable, the most easily tilled, the most responsive to management, the most suitable for diversified farming, and they are not easily eroded. The red to gray soils occupy smooth broad divides, flat hilltops, narrow winding ridges, and practically level benchlike positions on stream terraces. They occupy favorable relief for agricultural purposes, occurring usually on slopes of 2 to 4 percent. Erosion is not a serious problem; however, most of the uplands should be terraced where this has not been done. Winter cover crops aid in the control of erosion and the improvement of the soil. Natural surface drainage and internal drainage are good. The soils warm early in spring and are among the first on which agricultural operations are begun. The subsoils are sufficiently heavy textured to retain moisture and fertilizer, yet they are sufficiently pervious to allow free movement of moisture in the surface soil and subsoil and ample penetration by plant roots. They can be built up to a high state of productivity, which, however, is not permanent, as fertilizer must be applied annually either in mineral or organic form for the economical production of crops.

The soils of this group occurring on upland positions are Lloyd, Cecil, Ruston, Durham, Gilead, and Marlboro sandy loams, Norfolk sandy loam and its deep and sloping phases, Chesterfield sandy loam, deep phase, Norfolk loamy sand, and Madison sandy loam, while those occurring on terrace positions are Hiwassee fine sandy loam and Kalmia and Altavista sandy loams.

The soils of this group are well suited to all locally grown crops and produce excellent yields when properly managed. They are well suited to a wide variety of crops. Cropping systems should be followed on an entire farm to meet the needs of the farm and to make the best and most profitable use of all open land. Each farm presents a problem of its own, thereby making crop planning a job that must be worked out on each individual farm.

Following are some things that should be done in developing a cropping system for a farm on these soils: (1) Determine food and feed needs of the farm and acreage required at present yields to meet them; (2) set aside steep and eroded areas for kudzu or planting to other perennials; (3) clear all creek and branch bottoms now in brush and establish perennials and pastures; (4) establish perennials, as kudzu, on ditches, gullies, outlets, and field roads to help control water and, in addition, to furnish some temporary grazing or hay; (5) establish a few acres of perennials, as kudzu or sericea lespedeza, on good land smooth enough to mow to produce a supply of hay. Do not depend on rough eroded areas to produce ample hay. Planting the waste areas in perennials is a reclamation job with the possibilities of some hay or grazing; (6) set aside the soils of this group for production of row crops and build these up to the highest possible state of production by use of proper rotations, legumes, and farm manures; (7) include seed production areas to produce ample seed for farm; (8) cropping system should provide 100 percent cover for farm in winter insofar as possible.

The following rotations may be adapted to farm needs and the best use of land:

2-year rotations:

1. Cotton fertilized with 300 to 600 pounds of a 6–8–4 fertilizer; 2. corn fertilized with 36 pounds of nitrogen.	1. Oats followed by crimson clover for grazing or seed; 2. back to oats or crimson clover.
1. Cotton fertilized with 300 to 600 pounds of a 6–8–4 fertilizer followed by winter legumes fertilized with 300 pounds of 16-percent superphosphate or 500 pounds of basic slag; 2. corn followed by winter legumes without fertilizer.	1. Peanuts, hogged; 2. corn or cotton.

3-year rotations:

1. Cotton followed by oats; 2. oats followed by cowpeas or soybeans. Winter legumes following the summer legumes; 3. corn following winter legumes.	1. Cotton fertilized with 300 to 600 pounds of 6–8–4 fertilizer; 2. peanuts, hogged; 3. corn follows hogged peanuts without fertilizer.
1. Cotton followed by vetch; 2. corn followed by oats; 3. oats followed by cowpeas or soybeans. Winter legumes following the hay crop.	1. Oats; 2. lespedeza; 3. lespedeza.

The most economical yields are obtained when legume crops are used frequently in the crop rotation. Hairy and monantha vetches, Austrian Winter peas, and blue lupines are well adapted to these soils and produce excellent growth late in winter and early in spring. They may be followed with corn or possibly cotton. These legume crops should be fertilized with 300 to 600 pounds of basic slag or its equivalent. Summer legumes including sericea lespedeza, the annual lespedeza, cowpeas, soybeans, and kudzu may be used advantageously for soil building purposes and for the production of hay. Crotalaria may be used for soil improvement purposes.

GROUP 2

The soils of group 2 constitute 72,576 acres with 60 percent open for cultivation. They represent, in the main, the red eroded soils that occur on slopes of 3 to 7 percent and which are subject to severe erosion. These soils do not have so good moisture conditions as those of group 1, consequently, they are not so satisfactory for general farm crops. For oats and cotton they are probably about equal, but they are not so well suited to corn. Erosion is an important problem, but terracing together with the use of herbaceous cover crops should be sufficient to keep them in a good to excellent state of production.

The soils of this group are Davidson clay loam; Cecil sandy loam, eroded phase; Cecil and Louisa clay loams; Appling and Bradley sandy loams; Georgeville silty clay loam; Goldston slaty loam; Macon very fine sandy loam; and Herndon fine sandy loam. Except for Macon very fine sandy loam, all these soils occur in the Piedmont province.

Even though the soils of this group do not have so good moisture conditions for crops as those of group 1, moisture is ample under good management for good to excellent yields. The most commonly recommended rotations are about the same as for group 1.

GROUP 3

The soils of group 3, representing the fairly well-drained overflow bottoms and basins, are Congaree, Chewacla, and Iuka silt loams, Congaree sandy loam, and Starr loam. They cover 12,224 acres with 20 percent open for cultivation and are the most fertile and productive soils in the county; very little or no fertilizers are used, and excellent crops of corn and hay, particularly Johnson grass, are obtained. Pastures are excellent on these soils. The corn crop is seldom fertilized, but an application of nitrate of soda probably would prove economical in most areas. Crops are seldom rotated. Areas are used mainly for corn with soybeans or cowpeas grown in certain years. Corn with crotalaria planted during the last cultivation of the corn is one of the best farming practices. The susceptibility to overflow makes the growing of winter legume crops and winter oats hazardous. Spring oats and occasionally winter oats may be grown in some places.

GROUP 4

The soils of group 4 have shallow surface soils and yellow to brown hard compact subsoils that do not allow rapid penetration of water. They constitute a total of 18,048 acres with 64 percent open for cultivation. These soils are best suited to crops that grow early in spring when rainfall is ample, but they are droughty for most crops, particularly corn. Cotton does fairly well as it is able to withstand droughty soils better than other crops commonly grown.

The upland soils of this group are Helena and Chesterfield sandy loams, Iredell loam, Susquehanna fine sandy loam, and Eutaw clay. Flint sandy loam is the only member occupying a terrace position. The soils of the uplands occur on slopes of 2 to 6 percent. The relief, together with the hard compact nature of the subsoil, makes them subject to erosion. Short extremely crooked terraces that divide the soil areas into small irregular-shaped fields are required for erosion control. This is not true for Eutaw clay of this group, as none of it is clear or cultivated.

Cotton, corn, oats, soybeans, and lespedeza are grown on areas of these soils, but the areas are better suited to cotton than corn under current conditions. As moisture is a limiting factor for crop production in this group of soils, they will probably not respond to liberal fertilization as will those of groups 1 and 2. In addition to needing fertilizers, these soils also need their moisture condition improved by deep plowing and the incorporation of organic matter.

The same type of rotation and soil improvement practices may be used as on group 1, but net returns an acre will be considerably less because of the more droughty condition. Until the organic matter has been built up to a relatively high state, corn yields are relatively low. It is therefore suggested that a rotation system for these soils be based around the liberal use of legume crops or a rotation of cotton and peanuts with the latter hogged off.

The more sloping areas of these soils should be planted to sericea lespedeza or kudzu, as these crops aid in the conservation of the soil and at the same time supply hay or grazing. For best results these crops should receive applications of superphosphate or basic slag and muriate of potash every 2 or 3 years.

GROUP 5

The soils of group 5 are extremely sandy and are subject to the leaching of soluble plant nutrients. Norfolk sand and its sloping phase are the members of this group, and they constitute the most sandy areas of the county. A total of 16,256 acres is mapped with 58 percent open for cultivation, the rest growing principally scrub oak and shortleaf and loblolly pines.

Even though the soils of this group are extremely sandy, they produce fair to good yields under good management. Farm management practices should include turning under large quantities of organic matter or liberal applications of fertilizer. The use of crotalaria or hogged-off peanuts is one of the most economical means of increasing the productive capacity of these soils. When one of these crops is used in rotation with cotton or corn, fair to good yields are obtained. Peanuts are probably the best crop for these soils, but cotton, corn, peaches, figs, and grapes do well. A 2-year rotation of cotton and peanuts, the latter hogged off, is one of the best rotations. Another rotation commonly used by farmers is lespedeza and native pasture for 2 to 4 years followed by cotton, corn, or peanuts 2 or 3 years and then return to pasture. This rotation is satisfactory when land is plentiful.

GROUP 6

The soils of group 6 occur on rolling to strongly rolling relief of 6- to 11-percent gradient and are consequently very subject to erosion. Cecil and Louisa sandy loams and their eroded rolling phases; Cecil, Lloyd, and Louisa clay loams, and their rolling phases; Appling sandy loam, rolling phase; Davidson clay loam, rolling phase; Bradley and Chesterfield sandy loams, sloping phases; Gilead sandy loam, eroded phase and eroded sloping phase; Lloyd stony loam, rolling phase; and Gilead-Susquehanna sandy loams, eroded sloping phases, all occur on upland positions. They constitute a total of 119,104 acres with 27 percent cultivated to cotton, corn, soybeans, and pasture, particularly lespedeza pasture, and some kudzu or sericea lespedeza. The rest is in forest largely of shortleaf, longleaf, and loblolly pines, post oak, sweetgum, hickory, and many other trees of minor importance.

The soils of this group are inherently fairly fertile, but excessive erosion resulting from the rolling topography has decreased the fertility and moisture-holding capacity to a relatively low state. Measures to prevent erosion are the greatest problems in the farming of these soils. A complete water disposal system, including terracing and stabilized outlets, and contour tillage are necessary, and the use of small grains and winter legumes is most essential for the conservation and improvement of the soils. The crop rotation system best suited to these soils is one that aids in soil conservation as well as increases the soil fertility. A crop rotation of 3 or 4 years of kudzu followed by

2 or 3 years of row crops, either cotton or corn, has been used advantageously in many locations. Another good rotation is cotton fertilized with 300 to 600 pounds of a 6–8–4 fertilizer followed by a winter legume fertilized with 300 pounds of 16-percent superphosphate or 500 pounds of basic slag. In this rotation corn follows the winter legume and receives no fertilizer. These soils require intensive farm management practices for their proper use and conservation. Many of the more eroded areas should be established to kudzu for temporary pasture or as a hay crop. Sericea lespedeza is also recommended for areas of these soils.

GROUP 7

The soils of group 7 represent the gray poorly drained wet soils of the county. They constitute a total of 42,368 acres with 3 percent open for cultivation; the rest is in forest and range land pasture. The members of this group are Alluvial soils (Wehadkee soil material), Alluvial soils (Bibb soil material), Bibb silt loam, Worsham, Grady, Plummer, and Myatt sandy loams. To utilize these soils for crops, stream channels need to be straightened and deepened. They are best used for woodland pasture and improved pasture together with sorghum, sugarcane, or soybeans. Liberal applications of phosphate, lime, and potash are necessary for pasture and the crops mentioned. About 2 tons of crushed limestone, 500 pounds of basic slag, and 25 to 50 pounds of muriate potash are recommended for pastures.

Land should be plowed and harrowed thoroughly to form a good seedbed. This should be done sometime ahead of seeding so that the seedbed will be settled and firm when seeding is done. If stumps or other obstructions make plowing impractical, the surface should be loosened with a spring-tooth harrow. If pastures are to be seeded in spring, it may be best to prepare land in fall and freshen it with harrow just before sowing in spring. Breaking land in June or early in July and running over it every 10 days or 2 weeks with a harrow is excellent preparation for seeding pasture mixtures in September and early in October. This method has given excellent stands of fall seedings.

A good pasture must contain both grasses and legumes to give animals the best grazing, as legumes tend to add nitrogen, which stimulates the growth of grasses. A pasture legume is just as essential for soil-building purposes on pastures as cover crops are on cropland. The areas should be seeded to 10 pounds of Dallis grass; 2 pounds of white Dutch clover; and 10 pounds of annual lespedeza, if not subject to overflow.

GROUP 8

The soils of group 8 are the most broken, hilly, rugged, and stony soils in the county. Except for very small select spots, the relief is too severe for satisfactory crop production; these areas are, therefore, best suited to timber or range land pasture, and they also make excellent game refuges. A total of 52,800 acres is included in this group with only 3 percent open for cultivation. The cultivated areas are very small and badly scattered. Shortleaf, loblolly, and longleaf pines and various kinds of oak constitute most of the forest growth.

The members of this group are Cecil clay loam, hilly phase; Wilkes

sandy loam; Guin sandy loam, steep phase; Susquehanna clay and its sloping phase; Edgemont stony loam and its steep phase.

As these soils are best suited to forestry, considerable attention should be given to the care and management of the forests. The following precautions should be practiced: (1) Clean up after logging; utilize limbs and tops for fuel and pulpwood; lop slash low to the ground and scatter. (2) In small tracts plow or disk lanes 15 to 20 feet wide adjacent to boundaries; avoid plowing furrows at right angles to contours; on steep slopes rake off surface litter instead of plowing. (3) Divide large tracts into 20- to 60-acre blocks and construct lanes 15 to 20 feet wide by plowing, disking, raking, or burning; clean lanes once each year. (4) As soon as an infested tree is discovered, it should be cut as near ground as possible and removed; the top, bark, or slabs, and other refuse should be burned. (5) Thin overcrowded stands of pine, poplar, and other valuable hardwoods to relieve crowding and to allow more rapid growth of better trees; in thinning, first remove diseased, defective, deformed, suppressed, and otherwise inferior trees; if stand is still overcrowded, thin so that tops of individual trees will just stand to themselves without interlapping of branches. (6) Improve stands of pine and hardwood by cutting large, overmature, stagheaded, or diseased trees. (7) Thin overcrowded pine stands from October through March; make improvement cuttings in hardwoods at any season. (8) Prune 100 to 150 of better trees an acre to a height of about 17 feet above ground provided this does not remove green limbs from more than two-thirds the height of the tree; trees pruned should not be less than 4 inches or more than 10 inches in diameter; for best results, use a curved pruning saw on a 10-foot pole handle, and prune limbs as close to the trunk as possible. (9) Plant, to desirable tree species, areas where seedlings and saplings are scattered and seed trees are absent.

MORPHOLOGY AND GENESIS OF SOILS

Soil is the product of the forces of weathering and soil development acting on the parent material deposited or accumulated by geologic agencies. The characteristics of the soil at any given point depend on (1) the physical and mineralogical composition of the parent material; (2) the climate under which the soil material has accumulated and has existed since accumulation; (3) the plant and animal life in and on the soil; (4) the relief, or lay of the land; and (5) the length of time the forces of development have acted on the material. The climate, and its influence on soil and plants, depends not only on temperature, rainfall, and humidity but also on the physical characteristics of the soil or soil material and on the relief, which, in turn, strongly influence drainage, aeration, runoff, erosion, and exposure to sun and wind.

Lee County is in the Red and Yellow soil region of the United States. In this area are both Yellow Podzolic and Red Podzolic soils, and some of them are lateritic although no true Laterites are developed.

The general relief ranges from almost level or undulating to sloping, rolling, hilly, and steep. For the greater part of the soils surface drainage is good to excessive, and only small areas in the first bottoms

and a few flat areas or depressions in the uplands are poorly drained. For the most part the county has a dendritic drainage system.

The county has a modified continental climate, characterized by long warm summers, short mild winters, and a relatively high rainfall. The moderately high temperatures favor rapid chemical reactions under the moist conditions that exist in the solum most of the time. High rainfall favors rather intense leaching of the soluble materials, as alkalies and alkaline earths, particularly from the A horizon, and the translocation of less soluble material and colloidal material downward in the B horizon. The soil is frozen for only short periods and to only shallow depths during the winter. The climatic conditions are the same throughout the county, and in many places the relief in the Piedmont province is similar to that in the Coastal Plain. The main differences in soil development cannot be attributed to these factors but are due mainly to the parent material and to the influence of the native vegetation.

All the soils have developed under a forest cover of both deciduous and coniferous types. In the Piedmont province hardwoods predominate. In this area of moderate to warm temperature and rather heavy rainfall, there has been little chance for the accumulation of organic matter in the soil. In the forested areas a thin covering of leafmold or forest debris is on the surface, and the first 2 or 3 inches of the A horizon contains enough organic matter to produce a gray or brownish-gray color. The soils range from gray or yellowish gray to red. The living organisms influencing soil development are plants and micro-organisms. Trees root deeply into the soil and parent material and feed on mineral nutrients, which they deposit through the leaves on the soil. In this way some of the essential minerals are returned to the upper part of the soil to counterbalance the leaching process.

The parent materials in the Piedmont province and Coastal Plain are entirely different in their physical and chemical composition. The Piedmont is the region of metamorphic rocks of the pre-Cambrian and preceding ages and includes crystalline rocks, as granite, schist, gneiss, hornblende gneiss, and small areas of so-called slates. Angular fragments of quartz are common on the surface, and veins of quartz occur in many of the crystalline rocks. Many of these rocks have disintegrated to depths of 10 to 60 feet or more. The solum is 2 to 6 feet thick or more. The soils of the Piedmont province have developed through the soil-forming processes from the weathered products of these rocks and are residual or formed in situ. Throughout this part a striking and consistent correlation exists between the soil series and the consolidated rock underlying the parent material. The materials comprising the Coastal Plain part were deposited in the sea during the late Mesozoic age, or Upper Cretaceous, and are covered by the Tuscaloosa formations consisting of light and varicolored irregular-bedded and unconsolidated sand, sandy clay, clay, and gravel.

As a result of a wide variation in the rock formations several distinct soil series have developed. In some instances the similar parent material has given rise to two or more soil series. The granites, gneisses, and schists are acid rocks, and the soils developed from the weathered

products of them are different, especially in their chemical composition, from the soils developed over the basic rocks and are still more different from the soils developed from the beds of unconsolidated sand, sandy clay, and clay of the Coastal Plain. The Hollis quartzite has not only influenced the relief but has given rise to a soil series essentially different in its characteristics from any soil developed over any other parent material in the county. Along the Chattahoochee River and some of the larger creeks some areas of soil are on terraces and second bottoms. These soils have developed from beds of old alluvium. In the first bottoms along the streams are long narrow strips of soils that owe their origin to young and recently deposited materials by the streams.

In the higher categories of classification are three groups of soils—(1) zonal, (2) azonal, and (3) intrazonal.[5]

The zonal soils have well-developed characteristics that reflect the influence of the active factors of soil genesis, as climate, living organisms, and vegetation. In this group are the Cecil, Davidson, Madison, Lloyd, Appling, Durham, Georgeville, Bradley, Chesterfield, Herndon, Hiwassee, Norfolk, Ruston, Marlboro, Kalmia, and Altavista soils.

The outstanding characteristics of the texture profile of the normal or zonal soils include a comparatively eluviated A horizon underlain by a finer and heavier textured illuviated layer or B horizon, which is usually uniform in color and well oxidized. Beneath this layer is the C horizon varying considerably in texture but which is generally coarser in texture than the B horizon and commonly finer than the A horizon. On some of the soils that had a relatively thick A horizon in their virgin state, accelerated erosion has removed part or all of the original sandy covering, thus exposing the yellow or red clay and destroying the normal profile.

Azonal soils are those without the well-developed profile characteristics because of their youth or condition of parent material or relief that prevent the development of zonal soil profile characteristics. This group includes the Bibb, Iuka, Chewacla, Congaree, and Starr soils of the bottom lands and colluvial slopes. These soils do not have well-developed profiles because they are developed from very recent alluvial and colluvial materials and are continually being modified by the deposition of fresh material from the eroded uplands. Azonal soils also include the Lithosols, which are represented in Lee County by the Louisa, Wilkes, Guin, Edgemont, and Goldston soils, and Norfolk sand. Because of the dominant influence of the parent material, brought about in part by relief and geologic erosion, none of these soils has a zonal developed soil profile.

Intrazonal soils have more or less well-developed soil characteristics that reflect the dominating influence of some local factor of relief, parent material, or age over the normal effect of climate and vegetation. These may be associated with two or more of the zonal groups. The parent material is largely responsible for the characteristics of this group, which include the soils of the Susquehanna, Eutaw, Iredell, Macon, Helena, Flint, and Gilead series. Worsham, Grady, Plummer,

[5] BALDWIN, M., KELLOGG, C. E., and THORP, J. SOIL CLASSIFICATION. U. S Dept. Agr. Yearbook (Soils and Men) 1938: 979–1001. 1938.

and Myatt soils do not have zonal profile development because of imperfect drainage.

Selected profile descriptions of representative soils in the zonal (Cecil, Davidson, and Norfolk), azonal (Chewacla), and intrazonal (Macon) groups are as follows:

A profile of Cecil sandy loam taken 2 miles northeast of Opelika (NW¼NE¼ sec. 5, T. 19 N., R. 27 E.). All the horizons in this profile range from strongly to very strongly acid in reaction.

0 to 1 inch, dark-gray sandy loam containing a large quantity of organic matter and some leafmold on the surface.
1 to 7 inches, light yellowish-brown sandy loam characterized by single-grain condition.
7 to 11 inches, moderate yellowish-brown or weak-red friable clay loam.
11 to 30 inches, moderate-red to dark-red heavy stiff but brittle clay with moderately developed fine blocky structure.
30 to 65 inches, light-red moderately friable clay.
65 to 132 inches, purplish or light-red soft micaceous clayey material; large quantity of finely divided mica and friable disintegrated gneiss.

A profile of Davidson clay loam taken about 2 miles west of Bleecker (NW¼NE¼ sec. 2, T. 18 N., R. 28 E.). The entire profile ranges from slightly to medium acid in reaction.

0 to 6 inches, dark-brown to reddish-brown finely granular clay loam.
6 to 12 inches, reddish-brown heavy clay loam.
12 to 36 inches, dark-red heavy stiff smooth but moderately brittle clay that breaks into irregular-shaped particles, assuming a fine blocky structure.
36 to 60 inches, light reddish-brown clay moderately heavy having a coarse blocky structure.
60 to 120 inches, yellowish-brown or light-red somewhat compact clay.
120 inches +, light yellowish-brown or reddish-yellow friable soft disintegrated dark-colored basic rock.

A profile of a sample of Norfolk sandy loam taken 3 miles west of Smiths Station (SW¼ sec. 21, T. 18 N., R. 29 E.). Both surface soil and subsoil are moderately to very strongly acid in reaction.

0 to 4 inches, medium- to yellowish-gray single-grained light-textured sandy loam or loamy sand.
4 to 8 inches, yellowish-gray single-grained light-textured sandy loam.
8 to 14 inches, yellowish-gray sandy loam.
14 to 36 inches, light yellowish-brown or dusky-yellow friable and crumbly sandy clay.
36 to 48 inches, mottled light-gray, yellow, and reddish-brown hard slightly compact but brittle sandy clay material of the Coastal Plain.

A profile of a sample of Chewacla silt loam taken 3½ miles south and 1½ miles west of Chewacla (SW¼NE¼ sec. 8, T. 18 N., R. 27 E.). Both the surface soil and subsoil are medium to strongly acid in reaction.

0 to 10 inches, medium-brown friable silt loam.
10 to 18 inches, brownish-gray friable silt loam.
18 to 38 inches, light-gray mottled with brown and yellow rather heavy silt loam.

The structure of the materials comprising this profile are single-grained to laminated. This soil has developed from recent alluvial materials that were washed from the soils of the Piedmont province.

A sample of Macon very fine sandy loam taken 1½ miles south of Marvyn (NE¼SE¼ sec. 31, T. 17 N., R. 27 E.) has the following profile characteristics:

0 to 3 inches, brownish-gray very fine sandy loam containing a high percentage of fine sand.
3 to 9 inches, yellowish-gray very fine sandy loam with a high percentage of fine sand and silt.
9 to 18 inches, dark-brown heavy clay, which under normal moisture conditions breaks into irregular-shaped particles assuming a blocky structure.
18 to 26 inches, dark-brown heavy clay finely mottled with dark red and medium gray.
26 to 48 inches, intensely mottled light- to medium-gray, reddish-brown, and yellow very heavy fine sandy clay.

This type is developed from beds of heavy clay and fine sandy clay of the Coastal Plain. Both surface soil and subsoil are medium acid in reaction. At a depth of 9 to 48 inches the material of the various layers is massive.

The classification of soil series in the county, the parent material from which they are derived, relief, drainage, and B horizon are shown in table 8.

TABLE 8.—*Classification of soil series in Lee County, Ala., on the basis of characte*

Great soil group	Series	Parent material (parent rocks)	Relief
		RESIDUAL FROM UNDERLYING ROCK	
Red Podzolic	Davidson	Hornblende schist and diorite	Undulating to rolling
	Lloyd	Mixture of basic and acid rocks	Undulating to strongly rolling
	Cecil	Gneiss, schist, and granite	Undulating to hilly
	Madison	Quartz mica schist	Undulating to gently sloping
	Georgeville	Slate and schist	Undulating to rolling
	Appling [1]	Granite and gneiss	do
	Bradley	Coastal Plain material over granite and gneiss.	do
	Herndon [1]	Slate and schist	do
Yellow Podzolic	Durham	Granite and gneiss	Gently sloping
	Helena	Aplitic granite	Undulating to gently rolling
	Chesterfield	Coastal Plain material over granite and gneiss.	Undulating to rolling
Lithosol	Louisa	Mica schist	do
	Goldston	Slate and schist	do
	Edgemont	Quartzite and conglomerate	Sloping to steep
	Wilkes	Granite, gneiss, and diorite	Sloping to hilly
Planosol	Iredell	Hornblende schist and diorite	Undulating
		RESIDUAL FROM COASTAL PLAIN MATERIAL	
Red Podzolic	Ruston [1]	Sand and sandy clay	Undulating to gently sloping
Yellow Podzolic	Norfolk	do	Nearly flat to sloping
	Marlboro	do	do
Lithosol	Susquehanna	Heavy clay	Undulating to rolling
	Guin	Sand, sandy clay, and gravel	Rolling to steep
	Gilead	Sand and sandy clay	Undulating to hilly
Planosol	Eutaw	Heavy clay	Level to undulating
	Macon	do	Undulating to gently sloping
	Grady	do	Flat; saucerlike depressions
Half Bog	Plummer	Sandy clay	Nearly level to gently undulating
		COLLUVIUM	
Red Podzolic	Starr	Materials from granite and gneiss	Flat to gently sloping
Planosol	Worsham	do	do

		OLD ALLUVIUM	
Red Podzolic	Hiwassee	Materials from granite and gneiss	Smooth to gently sloping
Yellow Podzolic	Altavista	do	Flat to gently sloping
	Kalmia	Material from Coastal Plain	Nearly flat
Half Bog	Flint	do	Nearly flat to undulating
	Myatt	do	Flat
		RECENT ALLUVIUM	
Alluvial soils	Congaree	Materials from granite, gneiss, and schist	Flat
	Chewacla	do	do
	Iuka	Materials from Coastal Plain material	do
	Bibb	do	do

[1] The B horizon is intermediate in color between the Red Podzolic and Yellow Podzolic soils.

The pH determinations of a number of soil types in the county are given in table 9.

TABLE 9.—*pH determinations on a number of soils from Lee County, Ala.*[1]

Soil type and sample No.	Depth	pH	Soil type and sample No.	Depth	pH
Davidson clay loam:	*Inches*		Macon very fine sandy loam—Con.	*Inches*	
418207	0– 6	5.8	418236	18– 26	4.9
418208	6– 12	5.6	418237	26– 48	4.6
418209	12– 36	5.6	Susquehanna fine sandy loam:		
418210	36– 60	5.3	418252	0– 2	5.2
418211	60–120	5.2	418253	2– 11	5.4
418212	120+	5.5	418254	11– 19	5.1
Hiwassee fine sandy loam:			418255	19– 31	5.0
418224	0– 6	6.5	418256	31–50	5.0
418225	6– 10	5.6	Lloyd sandy loam:		
418226	10– 36	5.3	418271	0– 6	6.2
418227	36– 60	5.0	418272	6– 14	5.7
Norfolk sandy loam:			418273	14– 26	5.5
418228	0– 4	5.3	418274	26– 47	5.3
418229	4– 8	5.5	418275	47– 72	5.1
418230	8– 14	5.3	418276	72–115	5.0
418231	14– 36	4.9	Cecil sandy loam:		
418232	36– 48	4.7	418288	0– 1	4.1
Macon very fine sandy loam:			418289	1– 7	4.5
418233	0– 3	5.8	418290	7– 11	4.7
418234	3– 9	5.8	418291	11– 30	5.1
418235	9– 18	5.1	418292	30– 65	5.2
			418293	65–132	5.1

[1] Determinations made by the glass-electrode method using water to soil ratio of 2:1.

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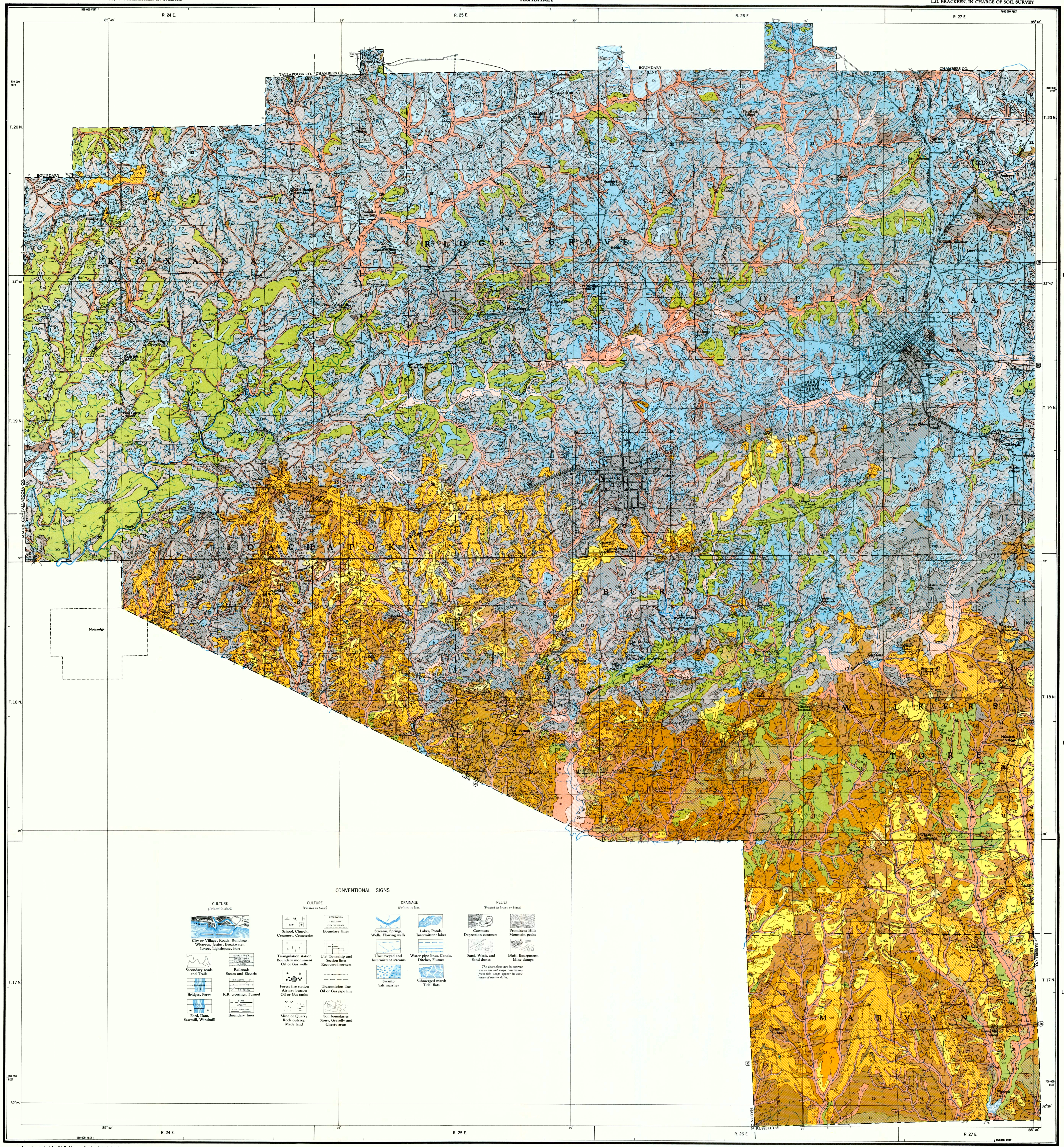
MAP DRAFTING, J.W. McKERICHER, IN CHARGE

SOIL MAP
LEE COUNTY-WESTERN SHEET
ALABAMA

ALABAMA DEPARTMENT OF AGRICULTURE
AND INDUSTRIES
R.J. GOODE, COMMISSIONER
L.G. BRACKEEN, IN CHARGE OF SOIL SURVEY



LEGEND

UNDULATING TO GENTLY SLOPING SANDY LOAMS OF THE COASTAL PLAIN UPLANDS (WITH FRIABLE SUBSOILS)
- Chesterfield sandy loam, deep phase — Chd
- Norfolk sandy loam — Nr
- Marlboro sandy loam — Mr
- Norfolk sandy loam, deep phase — Nrd
- Ruston sandy loam — Rs

UNDULATING TO GENTLY SLOPING SANDY LOAMS OF THE COASTAL PLAIN UPLANDS (WITH COMPACT, SANDY CLAY SUBSOILS)
- Gilead sandy loam — Gd
- Gilead sandy loam, eroded phase — Gdr

UNDULATING TO GENTLY SLOPING SANDY LOAMS OF THE COASTAL PLAIN UPLANDS (WITH HEAVY PLASTIC CLAY SUBSOILS)
- Macon very fine sandy loam — Mv
- Susquehanna fine sandy loam — Sf

UNDULATING TO SLOPING HEAVY CLAYS OF THE COASTAL PLAIN UPLANDS
- Susquehanna clay — Sc
- Susquehanna clay, sloping phase — Scx
- Eutaw clay — Ec

UNDULATING TO GENTLY SLOPING MODERATELY DEEP LOAMY SANDS OF THE COASTAL PLAIN UPLANDS
- Norfolk loamy sand — Ny

UNDULATING TO SLOPING DEEP SANDS OF THE COASTAL PLAIN UPLANDS
- Norfolk sand — Nd
- Norfolk sand, sloping phase — Ndx

UNDULATING TO GENTLY ROLLING CLAY LOAMS OF THE PIEDMONT UPLANDS (DEVELOPED FROM BASIC ROCKS)
- Davidson clay loam — Dc

UNDULATING TO GENTLY ROLLING CLAY LOAMS OF THE PIEDMONT UPLANDS (DEVELOPED FROM ACIDIC ROCKS)
- Cecil clay loam — Cc
- Georgeville silty clay loam — Gc
- Louisa clay loam — Lc

UNDULATING TO GENTLY ROLLING SANDY LOAMS OF THE PIEDMONT UPLANDS AND TERRACES (WITH MODERATELY STIFF TO FRIABLE RED SUBSOILS)
- Bradley sandy loam — Br
- Hiwassee fine sandy loam — Hw
- Cecil sandy loam — Ce
- Lloyd sandy loam — Lm
- Cecil sandy loam, eroded phase — Cer
- Madison sandy loam — Mm

UNDULATING TO GENTLY ROLLING SANDY LOAMS OF THE PIEDMONT UPLANDS (WITH MODERATELY STIFF TO FRIABLE YELLOW OR YELLOWISH BROWN SUBSOILS)
- Appling sandy loam — Al
- Durham sandy loam — Dl
- Chesterfield sandy loam — Ch
- Herndon fine sandy loam — Hf

UNDULATING TO GENTLY ROLLING SANDY LOAMS AND LOAMS OF THE PIEDMONT UPLANDS (WITH HEAVY PLASTIC CLAY SUBSOILS)
- Helena sandy loam — Hs
- Iredell loam — Im

SLOPING SANDY LOAMS OF THE COASTAL PLAIN UPLANDS (WITH FRIABLE SUBSOILS)
- Norfolk sandy loam, sloping phase — Nrx

SLOPING SANDY LOAMS OF THE COASTAL PLAIN UPLANDS (WITH COMPACT SUBSOILS)
- Gilead sandy loam, eroded sloping phase — Gdk
- Gilead-Susquehanna sandy loams, eroded sloping phases — GSk

ROLLING SANDY LOAMS OF THE PIEDMONT UPLANDS
- Appling sandy loam, rolling phase — Aln
- Cecil sandy loam, eroded rolling phase — Cec
- Bradley sandy loam, sloping phase — Brx
- Chesterfield sandy loam, sloping phase — Chx
- Louisa sandy loam, eroded rolling phase — Ldc

ROLLING CLAY LOAMS OF THE PIEDMONT UPLANDS
- Cecil clay loam, rolling phase — Ccn
- Lloyd clay loam, rolling phase — Lln
- Davidson clay loam, rolling phase — Dcn
- Lloyd stony loam, rolling phase — Lsn
- Louisa clay loam, rolling phase — Lcn

STEEP, VERY STONY, OR SHALLOW SOILS
- Cecil clay loam, hilly phase — Ccl
- Goldston slaty loam — Gl
- Edgemont stony loam — Es
- Guin sandy loam, steep phase — Gnz
- Edgemont stony loam, steep phase — Esz
- Wilkes sandy loam — Ws

WELL-DRAINED SOILS OF THE FLOOD PLAINS
- Congaree sandy loam — Co
- Congaree silt loam — Cs

IMPERFECTLY DRAINED SOILS OF THE FLOOD PLAINS
- Chewacla silt loam — Cm
- Iuka silt loam — Ik

POORLY DRAINED SOILS OF THE FLOOD PLAINS
- Alluvial soils (Bibb soil material) — AsB
- Alluvial soils (Wehadkee soil material) — AsW
- Bibb silt loam — Bs

SOILS OF THE COLLUVIAL SLOPES
- Starr loam — Sl

NEARLY LEVEL, MODERATELY WELL-DRAINED SOILS OF THE TERRACES
- Altavista sandy loam — Am
- Flint sandy loam — Fs
- Kalmia sandy loam — Ks

POORLY DRAINED SOILS OF THE UPLANDS AND TERRACES
- Grady sandy loam — Gr
- Plummer sandy loam — Ps
- Myatt sandy loam — My
- Worsham sandy loam — Wo

Area inspected by W. E. Hearn, Senior Soil Scientist.
Soils surveyed by C. H. Wonser, in Charge, and M.M. Striker, U.S. Department of Agriculture, and L. G. Brackeen, C. L. McIntyre, and Hoyt Sherard, Alabama Department of Agriculture and Industries.

Scale 1/48000
1 ½ 0 1 2 3 Miles
5000 0 5000 10000 Feet

Polyconic projection, 1927 North American datum.
Horizontal control by U. S. G. S. and U.S.C. and G.S.
Culture and drainage in part compiled from aerial photographs.
10000 foot grid based upon Alabama (East) system of plane coordinates.
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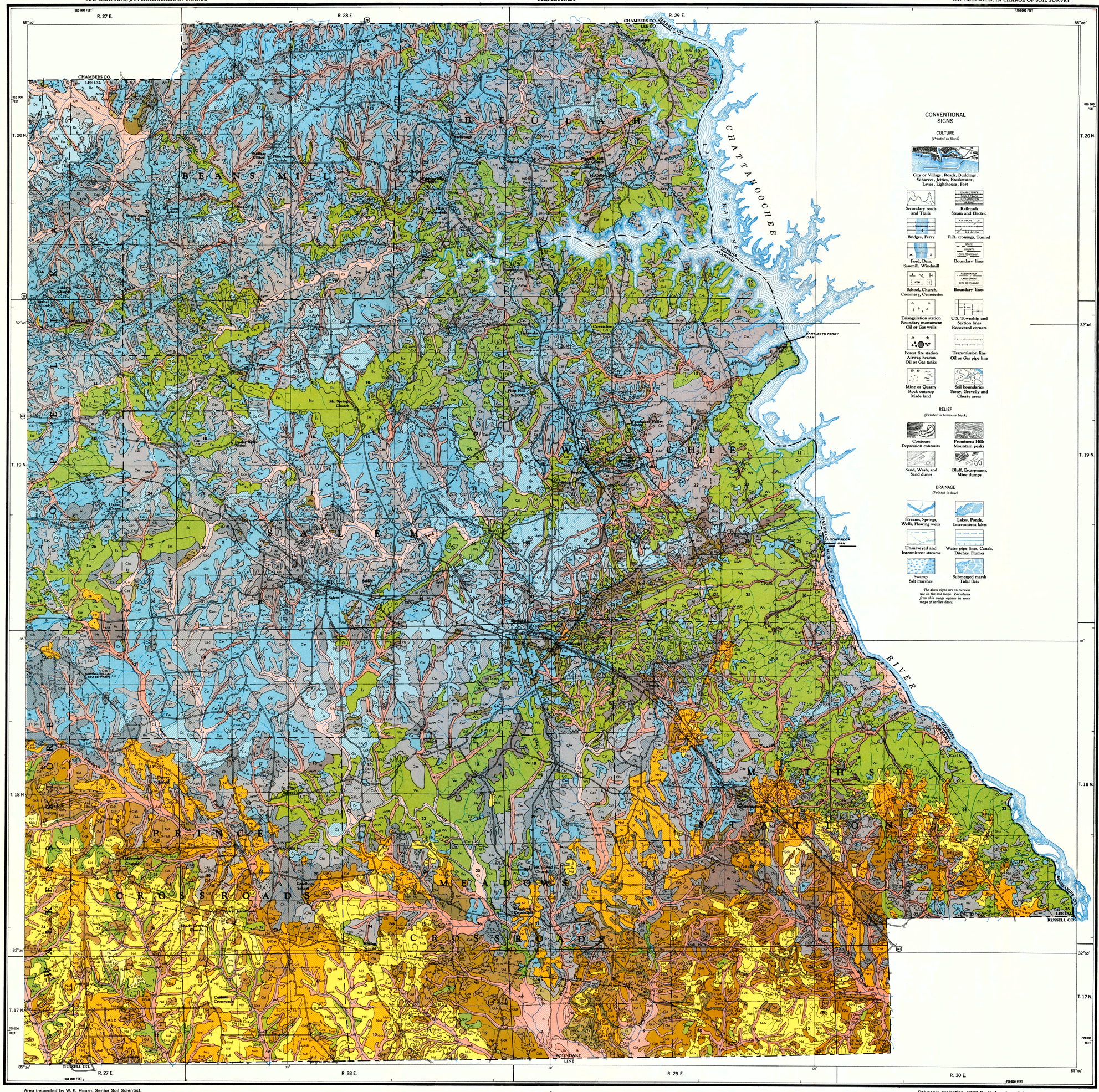
R.J. GOODE, COMMISSIONER
L.G. BRACKEEN, IN CHARGE OF SOIL SURVEY



Area inspected by W. E. Hearn, Senior Soil Scientist.
Soils surveyed by C. H. Wonser, in Charge, and M.M. Striker, U.S. Department of Agriculture, and L.G. Brackeen, C.L. McIntyre, and Hoyt Sherard, Alabama Department of Agriculture and Industries.

Scale 1:48000
1 0 1 2 3 Miles
5000 0 5000 10000 Feet

Polyconic projection, 1927 North American datum.
Horizontal control by U.S.G.S. and U.S.C. and G.S.
Culture and drainage in part compiled from aerial photographs.
10000 foot grid based upon Alabama (East) system of plane coordinates.
Surveyed in 1935-38. Series 1938.

CONVENTIONAL SIGNS

CULTURE
(Printed in black)

- City or Village, Roads, Buildings, Wharves, Jetties, Breakwater, Levee, Lighthouse, Fort
- Secondary roads and Trails
- Railroads Steam and Electric
- Bridges, Ferry
- R.R. crossings, Tunnel
- Ford, Dam, Sawmill, Windmill
- Boundary lines
- School, Church, Creamery, Cemeteries
- Boundary lines
- Triangulation station Boundary monument Oil or Gas wells
- U.S. Township and Section lines Recovered corners
- Forest fire station Airway beacon Oil or Gas tanks
- Transmission line Oil or Gas pipe line
- Mine or Quarry Rock outcrop Made land
- Soil boundaries Stony, Gravelly and Cherty areas

RELIEF
(Printed in brown or black)

- Contours Depression contours
- Prominent Hills Mountain peaks
- Sand, Wash, and Sand dunes
- Bluff, Escarpment, Mine dumps

DRAINAGE
(Printed in blue)

- Streams, Springs, Wells, Flowing wells
- Lakes, Ponds, Intermittent lakes
- Unsurveyed and Intermittent streams
- Water pipe lines, Canals, Ditches, Flumes
- Swamp Salt marshes
- Submerged marsh Tidal flats

The above signs are in current use on the soil maps. Variations from this usage appear in some maps of earlier dates.

LEGEND

UNDULATING TO GENTLY SLOPING SANDY LOAMS OF THE COASTAL PLAIN UPLANDS (WITH FRIABLE SUBSOILS)

- Chesterfield sandy loam, deep phase — Chd
- Norfolk sandy loam — Nr
- Marlboro sandy loam — Mr
- Norfolk sandy loam, deep phase — Nrd
- Ruston sandy loam — Rs

UNDULATING TO GENTLY SLOPING SANDY LOAMS OF THE COASTAL PLAIN UPLANDS (WITH COMPACT, SANDY CLAY SUBSOILS)

- Gilead sandy loam — Gd
- Gilead sandy loam, eroded phase — Gdr

UNDULATING TO GENTLY SLOPING SANDY LOAMS OF THE COASTAL PLAIN UPLANDS (WITH HEAVY PLASTIC CLAY SUBSOILS)

- Macon very fine sandy loam — Mv
- Susquehanna fine sandy loam — Sf

UNDULATING TO SLOPING HEAVY CLAYS OF THE COASTAL PLAIN UPLANDS

- Susquehanna clay — Sc
- Susquehanna clay, sloping phase — Scx
- Eutaw clay — Ec

UNDULATING TO GENTLY SLOPING MODERATELY DEEP LOAMY SANDS OF THE COASTAL PLAIN UPLANDS

- Norfolk loamy sand — Ny

UNDULATING TO SLOPING DEEP SANDS OF THE COASTAL PLAIN UPLANDS

- Norfolk sand — Nd
- Norfolk sand, sloping phase — Ndx

UNDULATING TO GENTLY ROLLING CLAY LOAMS OF THE PIEDMONT UPLANDS (DEVELOPED FROM BASIC ROCKS)

- Davidson clay loam — Dc

UNDULATING TO GENTLY ROLLING CLAY LOAMS OF THE PIEDMONT UPLANDS (DEVELOPED FROM ACIDIC ROCKS)

- Cecil clay loam — Cc
- Georgeville silty clay loam — Gc
- Louisa clay loam — Lc

UNDULATING TO GENTLY ROLLING SANDY LOAMS OF THE PIEDMONT UPLANDS AND TERRACES (WITH MODERATELY STIFF TO FRIABLE RED SUBSOILS)

- Bradley sandy loam — Br
- Hiwassee fine sandy loam — Hw
- Cecil sandy loam — Ce
- Lloyd sandy loam — Lm
- Cecil sandy loam, eroded phase — Cer
- Madison sandy loam — Mn

UNDULATING TO GENTLY ROLLING SANDY LOAMS OF THE PIEDMONT UPLANDS (WITH MODERATELY STIFF TO FRIABLE YELLOW OR YELLOWISH BROWN SUBSOILS)

- Appling sandy loam — Ar
- Durham sandy loam — Dl
- Chesterfield sandy loam — Ch
- Herndon fine sandy loam — Hf

UNDULATING TO GENTLY ROLLING SANDY LOAMS AND LOAMS OF THE PIEDMONT UPLANDS (WITH HEAVY PLASTIC CLAY SUBSOILS)

- Helena sandy loam — Hs
- Iredell loam — Im

SLOPING SANDY LOAMS OF THE COASTAL PLAIN UPLANDS (WITH FRIABLE SUBSOILS)

- Norfolk sandy loam, sloping phase — Nrx

SLOPING SANDY LOAMS OF THE COASTAL PLAIN UPLANDS (WITH COMPACT SUBSOILS)

- Gilead sandy loam, eroded sloping phase — Gdk
- Gilead-Susquehanna sandy loams, eroded sloping phases — GSk

ROLLING SANDY LOAMS OF THE PIEDMONT UPLANDS

- Appling sandy loam, rolling phase — Aln
- Cecil sandy loam, eroded rolling phase — Cec
- Bradley sandy loam, sloping phase — Brx
- Chesterfield sandy loam, sloping phase — Chx
- Louisa sandy loam, eroded rolling phase — Ldc

ROLLING CLAY LOAMS OF THE PIEDMONT UPLANDS

- Cecil clay loam, rolling phase — Ccn
- Lloyd clay loam, rolling phase — Lln
- Davidson clay loam, rolling phase — Dcn
- Lloyd stony loam, rolling phase — Lsn
- Louisa clay loam, rolling phase — Lcn

STEEP, VERY STONY, OR SHALLOW SOILS

- Cecil clay loam, hilly phase — Ccl
- Goldston slaty loam — Gl
- Edgemont stony loam — Es
- Guin sandy loam, steep phase — Gnz
- Edgemont stony loam, steep phase — Esz
- Wilkes sandy loam — Ws

WELL-DRAINED SOILS OF THE FLOOD PLAINS

- Congaree sandy loam — Co
- Congaree silt loam — Cs

IMPERFECTLY DRAINED SOILS OF THE FLOOD PLAINS

- Chewacla silt loam — Cm
- Iuka silt loam — Ik

POORLY DRAINED SOILS OF THE FLOOD PLAINS

- Alluvial soils (Bibb soil material) — AsB
- Alluvial soils (Wehadkee soil material) — AsW
- Bibb silt loam — Bs

SOILS OF THE COLLUVIAL SLOPES

- Starr loam — St

NEARLY LEVEL, MODERATELY WELL-DRAINED SOILS OF THE TERRACES

- Altavista sandy loam — Am
- Flint sandy loam — Fs
- Kalmia sandy loam — Ks

POORLY DRAINED SOILS OF THE UPLANDS AND TERRACES

- Grady sandy loam — Gr
- Plummer sandy loam — Pr
- Myatt sandy loam — My
- Worsham sandy loam — Wo

SUPPLEMENT TO THE SOIL MAP OF LEE COUNTY, ALABAMA, SHOWING IMPORTANT CHARACTERISTICS OF THE SOILS

Soil (type, phase, or land type)	Map symbol	Group (according to legend of soil map)	Parent material	Relief	Drainage	Color		Subsoil consistence
						Surface soil	Subsoil	
Alluvial soils (Bibb soil material).	AsB	Poorly drained soils of the flood plains	Coastal Plain alluvial material	Nearly flat	Poor	Dark gray	Gray, dark gray, or mixed dark gray and light gray.	Friable.
Alluvial soils (Wehadkee soil material).	AsW	Poorly drained soils of the flood plains	Piedmont alluvial material	Nearly flat	Poor	Gray to brown	Brownish gray mottled with gray to gray mottled with brown.	Friable.
Altavista sandy loam	Am	Nearly level, moderately well-drained soils of the terraces.	Old alluvium from Piedmont province material.	Level to gently sloping	Moderately good (fair internal).	Yellowish gray	Yellow	Friable to moderately compact.
Appling sandy loam	Al	Undulating to gently rolling sandy loams of the Piedmont uplands (with moderately stiff to friable yellow or yellowish-brown subsoils).	Weathered granite and gneiss	Undulating to gently rolling.	Good	Light gray	Yellowish brown, mottled in lower part.	Friable to moderately compact.
Rolling phase	Aln	Rolling sandy loams of the Piedmont uplands	Weathered granite and gneiss	Rolling (7–12 percent slopes).	Good	Light gray	Yellowish brown	Moderately compact.
Bibb silt loam	Bs	Poorly drained soils of the flood plains	Coastal Plain alluvial material	Nearly flat	Poor	Medium to light gray	Light gray mottled with yellow or brown.	Moderately friable.
Bradley sandy loam	Br	Undulating to gently rolling sandy loams of the Piedmont uplands and terraces (with moderately stiff to friable red subsoils).	Weathered granite and gneiss and thin mantle of Coastal Plain deposits.	Undulating to gently sloping.	Good	Brownish gray	Red or yellowish red	Moderately compact.
Sloping phase	Brx	Rolling sandy loams of the Piedmont uplands	Weathered granite and gneiss and thin mantle of Coastal Plain deposits.	Sloping	Good	Gray	Red	Moderately compact.
Cecil clay loam	Cc	Undulating to gently rolling clay loams of the Piedmont uplands (developed from acidic rocks).	Weathered granite, gneiss, and schist.	Gently undulating to smoothly sloping.	Good	Light red to reddish brown	Red	Moderately compact.
Hilly phase	Ccl	Steep, very stony, or shallow soils	Weathered granite, gneiss, and schist.	Hilly	Good	Red to brownish red	Red	Moderately compact.
Rolling phase	Ccn	Rolling clay loams of the Piedmont uplands	Weathered granite, gneiss, and schist.	Rolling	Good	Reddish brown	do	Moderately compact.
Cecil sandy loam	Ce	Undulating to gently rolling sandy loams of the Piedmont uplands and terraces (with moderately stiff to friable red subsoils).	Weathered granite and gneiss rock material.	Gently undulating to gently sloping.	Good	Gray to brownish gray	Yellowish brown at 6–9 inches; red or reddish brown or red below.	Moderately compact.
Eroded phase	Cer	Undulating to gently rolling sandy loams of the Piedmont uplands and terraces (with moderately stiff to friable red subsoils).	Weathered granite or mica schist	Gently undulating to gently sloping.	Good	Gray	Brownish red	Moderately compact.
Eroded rolling phase	Cec	Rolling sandy loams of the Piedmont uplands	Weathered granite and gneiss	Rolling	Good	Gray or brown to reddish brown.	Red	Moderately compact.
Chesterfield sandy loam	Ch	Undulating to gently rolling sandy loams of the Piedmont uplands (with moderately stiff to friable yellow or yellowish-brown subsoils).	Weathered granite and gneiss, thin mantle of Coastal Plain deposits.	Gently undulating to gently sloping.	Good	Light gray	Yellow or light yellowish brown	Moderately compcat.
Deep phase	Chd	Undulating to gently sloping sandy loams of the Coastal Plain uplands (with friable subsoils).	Thin mantle of Coastal Plain deposits, weathered granite and gneiss rocks.	Level to gently sloping	Good	Yellowish gray to light brownish gray.	Yellow or light yellowish brown	Friable.
Sloping phase	Chx	Rolling sandy loams of the Piedmont uplands	Thin mantle of Coastal Plain deposits, weathered granite and gneiss rocks.	Sloping (7–12 percent slopes).	Good	Gray	Yellow with some brown mottlings	Compact.
Chewacla silt loam	Cm	Imperfectly drained soils of the flood plains	Piedmont alluvial material	Nearly flat	Fair to imperfect	Brown to dark brown	Brownish gray mottled with gray or brown.	Friable.
Congaree sandy loam	Co	Well-drained soils of the flood plains	Piedmont alluvial material	Nearly flat	Fair to good	Brown	Light yellowish brown	Friable.
Congaree silt loam	Cs	Well-drained soils of the flood plains	Piedmont alluvial material	Nearly flat	Fair to good	Brown	Yellowish brown to grayish brown	Friable.
Davidson clay loam	Dc	Undulating to gently rolling clay loams of the Piedmont uplands (developed from basic rocks).	Weathered hornblende schist and diorite.	Undulating	Good	Dark brown to dark reddish brown.	Dark red to dark reddish brown, maroon colored.	Moderately compact.
Rolling phase	Dcn	Rolling clay loams of the Piedmont uplands	Weathered hornblende schist and diorite.	Rolling to hilly	Good	Dull red	Maroon red	Moderately compact.
Durham sandy loam	Dl	Undulating to gently rolling sandy loams of the Piedmont uplands (with moderately stiff to friable yellow or yellowish-brown subsoils).	Weathered granite and gneiss	Gently sloping	Good	Light gray to yellowish gray.	Yellow	Moderately friable.
Edgemont stony loam	Es	Steep, very stony, or shallow soils	Weathered quartzite and conglomerate.	Sloping to hilly broken	Good to excessive	Gray	Yellow to yellowish brown	Friable.
Steep phase	Esz	Steep, very stony, or shallow soils	Weathered quartzite and conglomerate.	Steep (30-percent slopes)	Good to excessive	Dark gray to yellowish gray.	Yellow to brown	Friable.
Eutaw clay	Ec	Undulating to sloping heavy clays of the Coastal Plain uplands.	Heavy clay of Coastal Plain	Level to undulating	Fair to poor (slow internal).	Dark gray to brownish gray.	Mottled light gray and brown	Plastc.
Flint sandy loam	Fs	Nearly level, moderately well-drained soils of the terraces.	Old alluvium from Coastal Plain material.	Nearly level	Fair	Brownish gray	Light brown to yellowish brown	Compact.
Georgeville silty clay loam	Gc	Undulating to gently rolling clay loams of the Piedmont uplands (developed from acidic rocks).	Weathered slate	Undulating to sloping	Good	Yellowish gray (0–4 inches)	Yellowish brown to light red (4–8 inches), red to dark yellowish red (8–35 inches).	Moderately compact.
Gilead sandy loam	Gd	Undulating to gently sloping sandy loams of the Coastal Plain uplands (with compact, sandy clay subsoils).	Sandy clay and clay of Coastal Plain.	Undulating to gently sloping.	Good (poor internal)	Light gray	Light yellow	Compact.
Eroded phase	Gdr	Undulating to gently sloping sandy loams of the Coastal Plain uplands (with compact, sandy clay subsoils).	Sandy clay and clay of Coastal Plain.	Undulating to gently sloping.	Good (poor internal)	Yellowish gray to light gray.	Pale yellow	Compact.
Eroded sloping phase	Gdk	Sloping sandy loams of the Coastal Plain uplands (with compact subsoils).	Sandy clay and clay of Coastal Plain.	Sloping to hilly	Good to excessive (poor internal).	Gray	Yellow to light yellowish brown	Compact.
Gilead-Susquehanna sandy loams, eroded sloping phases.	GSk	Sloping sandy loams of the Coastal Plain uplands (with compact subsoils).	Sandy clay and clay of Coastal Plain.	Sloping to hilly	Good to excessive (poor internal).	Gray, brown, reddish and yellow mixed.	Variable	Compact.
Goldston slaty loam	Gl	Steep, very stony, or shallow soils	Weathered slate	Undulating to rolling (3–7-percent slopes).	Varied; excessive to slow	Brownish gray	Mottled	Moderately friable (rock at about 12–30 inches).
Grady sandy loam	Gr	Poorly drained soils of the uplands and terraces	Heavy clay of Coastal Plain	Flat; saucer-like depressions.	Poor	Dark gray (0–7 inches)	Light gray to nearly white (7–18 inches), gray mottled with brown and yellow (18 inches).	Medium plastic.
Guin sandy loam, steep phase.	Gnz	Steep, very stony, or shallow soils	Sandy clay of Coastal Plain	Steep slopes (18–40 percent slopes).	Good	Variable	Variable	Variable.
Helena sandy loam	Hs	Undulating to gently rolling sandy loams and loams of the Piedmont uplands (with heavy plastic clay subsoils).	Weathered binary granite	Undulating to gently sloping.	Good to excessive (slow internal).	Light gray to grayish yellow (0–12 inches).	Yellowish gray mottled with red (12–30 inches) or yellow.	Plastic.
Herndon fine sandy loam	Hf	Undulating to gently rolling sandy loams of the Piedmont uplands (with moderately stiff to friable yellow or yellowish-brown subsoils).	Weathered schist with some quartzite.	Undulating to gently sloping.	Good	Yellowish gray	Pale yellow (7–10 inches); yellow to light yellowish brown (10–24 inches).	Moderately friable.
Hiwassee fine sandy loam	Hw	Undulating to gently rolling sandy loams of the Piedmont uplands and terraces (with moderately stiff to friable red subsoils).	Old alluvium from Piedmont material.	Smooth to gently sloping	Good	Brown	Dark red to reddish brown	Slightly compact.
Iredell loam	Im	Undulating to gently rolling sandy loams and loams of the Piedmont uplands (with heavy plastic clay subsoils).	Weathered basic rocks (diorites)	Undulating	Fair to good (very slow internal).	Brownish gray	Light yellowish brown	Dense, plastic.
Iuka silt loam	Ik	Imperfectly drained soils of the flood plains	Alluvium from Coastal Plain material.	Nearly flat	Fair (fair to poor internal).	Brown	Brownish gray (10–18 inches)	Friable.
Kalmia sandy loam	Ks	Nearly level, moderately well-drained soils of the terraces.	Alluvium from Coastal Plain material.	Nearly flat	Good	Yellowish gray (0–5 inches)	Weak yellow (5–18 inches)	Friable.
Lloyd clay loam, rolling phase.	Lln	Rolling clay loams of the Piedmont uplands	Weathered basic rock and gneiss	Rolling to hilly	Good	Dark brown to reddish brown.	Reddish brown to dark red	Moderately friable.
Lloyd sandy loam	Lm	Undulating to gently rolling sandy loams of the Piedmont uplands and terraces (with moderately stiff to friable red subsoils).	Mixture of weathered acid and basic rocks.	Nearly level to gently rolling.	Good	Dark brown	Dark brown to dark reddish brown	Moderately friable.
Lloyd stony loam, rolling phase.	Lsn	Rolling clay loams of the Piedmont uplands	Weathered hornblende rock and basic rock.	Rolling (7–12 percent slopes).	Good	Dark brown	Reddish brown	Compact to moderately friable.
Louisa clay loam	Lc	Undulating to gently rolling clay loams of the Piedmont uplands (developed from acidic rocks).	Weathered mica schist	Undulating to rolling	Good	Reddish brown (0–4 inches)	Dark red to reddish brown (4–16 inches).	Friable.
Rolling phase	Lcn	Rolling clay loams of the Piedmont uplands	Weathered mica schist	Rolling to hilly	Good	Red	Red	Friable.
Louisa sandy loam, eroded rolling phase.	Ldc	Rolling sandy loams of the Piedmont uplands	Weathered mica schist	Rolling	Good	Brownish gray to brown (0–4 inches).	Red to reddish brown (4–12 inches); red (12–24 inches).	Friable.
Macon very fine sandy loam	Mv	Undulating to gently sloping sandy loams and loams of the Coastal Plain uplands (with heavy plastic clay subsoils).	Heavy clay of Coastal Plain	Undulating to gently sloping.	Good (slow internal)	Brownish gray to dark gray (0–4 inches).	Light brownish gray (4–7 inches); dark brown (7–16 inches).	Plastic.
Madison sandy loam	Mm	Undulating to gently rolling sandy loams of the Piedmont uplands and terraces (with moderately stiff to friable red subsoils).	Weathered quartz mica schist	Undulating to gently sloping.	Good	Brownish gray to pale brown.	Red	Moderately friable.
Marlboro sandy loam	Mr	Undulating to gently sloping sandy loams of the Coastal Plain uplands (with friable subsoils).	Sandy clay of Coastal Plain	Nearly flat to gently undulating.	Good	Light brownish gray to brownish gray.	Yellow to dusky yellow	Friable.
Myatt sandy loam	My	Poorly drained soils of the uplands and terraces	Old alluvium from Coastal Plain material.	Flat	Poor	Dark gray	Light gray mottled with some yellow and brown.	Friable.
Norfolk loamy sand	Ny	Undulating to gently sloping moderately deep loamy sands of the Coastal Plain uplands.	Sandy clay and sand of Coastal Plain.	Undulating to gently sloping.	Good	Light gray to brownish gray (0–6 inches).	Pale yellow (6–36 inches)	Loose, friable.
Norfolk sand	Nd	Undulating to sloping deep sands of the Coastal Plain uplands.	Sandy clay and sand of Coastal Plain.	Undulating to gently sloping.	Good (rapid internal)	Light gray or somewhat yellow.	Light grayish yellow or pale yellow	Incoherent.
Sloping phase	Ndx	Undulating to sloping deep sands of the Coastal Plain uplands.	Sandy clay and sand of Coastal Plain.	Sloping to gently rolling	Good (rapid internal)	Light gray or somewhat yellow.	Light grayish yellow or pale yellow	Incoherent.
Norfolk sandy loam	Nr	Undulating to gently sloping sandy loams of the Coastal Plain uplands (with friable subsoils).	Sandy clay and sand of Coastal Plain.	Nearly flat to undulating.	Good	Brownish gray to yellowish gray.	Yellow to light yellow	Friable.
Deep phase	Nrd	Undulating to gently sloping sandy loams of the Coastal Plain uplands (with friable subsoils).	Sandy clay and sand of Coastal Plain.	Gently sloping	Good	Light gray	Yellow to pale yellow	Friable.
Sloping phase	Nrx	Sloping sandy loams of the Coastal Plain uplands (with friable subsoils).	Sandy clay ands and of Coastal Plain.	Sloping	Good	Brownish gray	Light gray to yellow	Friable.
Plummer sandy loam	Ps	Poorly drained soils of the uplands and terraces	Sandy clay of Coastal Plain	Nearly level to gently undulating.	Poor	Medium gray	Light gray (7–18 inches); mottled gray, red, and brown (18–30 inches).	Friable.
Ruston sandy loam	Rs	Undulating to gently sloping sandy loams of the Coastal Plain uplands (with friable subsoils).	Sandy clay and sand of Coastal Plain.	Undulating to gently sloping.	Good	Brownish gray	Yellowish brown (7–15 inches); reddish brown (15–36 inches).	Friable.
Starr loam	Sl	Soils of the colluvial slopes	Local slope, colluvial material from soils in Piedmont.	Nearly level to gently sloping.	Good (fair internal)	Brown to reddish brown	Brown to reddish brown	Friable.
Susquehanna clay	Sc	Undulating to sloping heavy clays of the Coastal Plain uplands.	Heavy clay of Coastal Plain	Gently sloping to sloping.	Good (poor internal)	Yellowish gray	Intensely mottled light gray, light red, and yellow.	Plastic.
Sloping phase	Scx	Undulating to sloping heavy clays of the Coastal Plain uplands.	Heavy clay of Coastal Plain	Sloping or rolling	Good (poor internal)	Reddish brown (0–4 inches); red to yellowish red (4–15 inches).	Red to yellowish red with faint-gray and yellow mottlings (4–15 inches); mottled red, gray, and yellow (15–30 inches).	Plastic.
Susquehanna fine sandy loam.	Sf	Undulating to gently sloping sandy loams of the Coastal Plain uplands (with heavy plastic clay subsoils).	Heavy clay of Coastal Plain	Undulating to gently sloping.	Good (poor internal)	Yellowish gray	Red to yellowish red with faint-gray and yellow mottlings (4–15 inches); mottled red, gray, and yellow (15–30 inches).	Plastic.
Wilkes sandy loam	Ws	Steep, very stony, or shallow soils	Weathered granite and gneiss rock	Strongly sloping to hilly and broken.	Good	Variable	Variable	Variable.
Worsham sandy loam	Wo	Poorly drained soils of the uplands and terraces	Weathered granite and gneiss	Nearly level to very gently sloping.	Poor	Light gray to dark gray	Light gray to nearly white mottled with gray and yellow.	Tough, slightly plastic.

704038—50—(Insert in envelope.)

TABLE 4.—*Characteristics of the soil series of*

Series	Relief	Drainage		Col
		External	Internal	Surface soil
Alluvial soils:				
Bibb soil material	Nearly flat	Poor	Poor	Dark gray
Wehadkee soil material	do	do	do	Gray to brown
Altavista	Level to gently sloping	Moderately good	Fair	Yellowish gray
Appling	Undulating to rolling	Good	Good	Light gray
Bibb	Nearly flat	Poor	Poor	Medium to light gray
Bradley	Undulating to sloping	Good	Good	Brownish gray
Cecil	Undulating to hilly	Very good to excessive.	do	Brownish gray or reddish brown.
Chesterfield	Undulating to sloping	Good	do	Medium gray
Chewacla	Nearly flat	Fair	Imperfect	Moderately brown
Congaree	do	do	Good	Brown
Davidson	Undulating to rolling	Very good	do	Dark reddish brown
Durham	Gently sloping	Good	do	Light gray to yellowish gray
Edgemont	Sloping to steep	Excessive	do	Gray to yellowish gray
Eutaw	Level to undulating	Fair to poor	Poor	Dark gray to brownish gray
Flint	Nearly level to undulating	Fair	do	Brownish gray
Georgeville	Undulating to sloping	Very good	Good	Yellowish gray
Gilead	Undulating to hilly	Good to excessive	Poor	do
Goldston	Undulating to rolling	Good	Good	Brownish gray
Grady	Flat; saucerlike depressions	Poor	Poor	Dark gray
Guin	Rolling to steep	Excessive	Good	Varicolored
Helena	Undulating to sloping	Good	Poor	Light gray to grayish yellow
Herndon	Undulating to gently sloping	do	Good	Yellowish gray
Hiwassee	Smooth to gently sloping	Very good	do	Brown
Iredell	do	Fair	Poor	Brownish gray
Iuka	Nearly flat	Fair to imperfect	do	Brown
Kalmia	do	Good	Good	Yellowish gray
Lloyd	Undulating to strongly rolling	Very good	do	Dark brown
Louisa	Undulating to rolling	Excessive	Very good	Brown to reddish brown
Macon	Undulating to gently sloping	Good	Slow	Brownish gray to dark gray
Madison	do	Very good	Very good	Brownish gray to pale brown
Marlboro	Nearly flat to gently undulating	Good	Good	Light brownish gray
Myatt	Flat	Poor	Poor	Dark gray
Norfolk	Nearly flat to sloping	Good	Good	Light brownish gray or yellowish gray.
Plummer	Nearly level to gently undulating	Poor	Poor	Medium gray
Ruston	Undulating to gently sloping	Very good	Good	Light brownish gray
Starr	Nearly level to gently sloping	Good	Fair	Brown to reddish brown
Susquehanna	Undulating to rolling	do	Poor	Yellowish gray to reddish brown.
Wilkes	Sloping to hilly	Excessive	Slow	Gray
Worsham	Nearly level to very gently sloping	Poor	Poor	Light gray to dark gray

TABLE 6.—*Estimated average acre yields of the principal crops on each soil in Lee County, Ala., under current and impr*

[Indexes in columns A refer to yields commonly obtained under current practices; those in columns B to yields that may be expected under the best practi

Soil (soil types, phases, complexes, and land types)	Cotton lint		Corn		Winter oats		Soybean hay		Peanuts		Sugarcane sirup		Sorghum (forage)		Sweet-potatoes		Open land	Principal crops or us
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B		
	Lb.	*Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Lb.*	*Lb.*	*Gal.*	*Gal.*	*Tons*	*Tons*	*Bu.*	*Bu.*	*Pct.*	
Alluvial soils:																		
Bibb soil material			[1] 10	30			[1] 0.75	1.50			[1] 150	175	[1] 12	20			1	Forest, pasture, sorghum
Wehadkee soil material			[1] 15	30	[1] 15	30	[1] 1.00	2.00			[1] 150	200	[1] 10	18			5	Forest, pasture
Altavista sandy loam	125	300	10	25	15	35	.50	1.00	500	800	125	150	8	15	60	100	36	Cotton, corn, oats, soybeans
Appling sandy loam	125	300	10	25	15	30	.50	1.00	700	1,200	90	125	7	12	50	75	61	do
Rolling phase	125	250	5	20	10	30	.50	1.00			75	100	7	12	40	70	33	do
Bibb silt loam							[1] .75	1.50			[1] 150	175	[1] 12	20			0	Forest, pasture, sorghum
Bradley sandy loam	125	300	10	25	15	35	.50	1.00	500	800	125	150	8	14	50	100	64	Cotton, corn, oats, soybeans
Sloping phase	125	250	8	20	10	25	.50	1.00			[2] 75	100	6	11	40	70	24	Cotton, corn, kudzu, forest
Cecil clay loam	125	300	8	20	10	25	.50	1.00	200	400	[2] 90	125	8	14			58	Cotton, corn, oats, soybeans, l
Hilly phase																	2	Forest, kudzu
Rolling phase	125	250	5	20	8	25	.50	1.00					6	12			24	Cotton, corn, kudzu, forest
Cecil sandy loam	250	500	15	35	20	40	1.00	1.50	700	1,200	[2] 150	175	10	15	75	125	62	Cotton, corn, soybeans, oats
Eroded phase	175	325	10	25	15	35	.75	1.50	500	900	125	150	8	14		100	62	do
Eroded rolling phase	125	250	8	20	10	25	.50	1.00	400	700	[2] 75	100	6	11	40	70	24	Cotton, corn, kudzu, forest
Chesterfield sandy loam	125	250	5	20	10	25	.50	1.00	400	700	60	90	5	10	40	70	69	Cotton, corn, oats, soybeans
Deep phase	250	500	15	35	20	40	1.00	1.50	700	1,200	150	175	10	15	80	125	87	do
Sloping phase	125	200	5	15	10	25	.50	1.00	400	700	65	90	5	10	40	70	15	Cotton, corn, kudzu, forest
Chewacla silt loam			[1] 15	30	[3] 10	30	[1] 1.00	2.00			[1] 160	210	[1] 12	20			21	Pasture, forest
Congaree sandy loam			15	35	[3] 20	40	1.00	1.50			[2] 175	225	10	15	100	150	43	Corn, Johnson grass, pasture
Congaree silt loam			20	50	[3] 20	35	1.00	1.50			[2] 175	225	12	20			20	do
Davidson clay loam	200	350	10	25	20	50	.75	1.50	200	400	[2] 150	175	10	15			86	Cotton, corn, oats
Rolling phase	125	250	8	20	10	30	.50	1.00	200	400			6	12			35	Cotton, corn, oats, soybean forest.
Durham sandy loam	200	375	15	35	20	40	1.00	1.50	700	1,200	150	175	10	15	90	140	51	Cotton, corn, soybeans, oats
Edgemont stony loam																	6	Forest, kudzu
Steep phase																	1	do
Eutaw clay			10	25	75	1.50					125	175	10	16			0	Forest, pasture
Flint sandy loam	125	300	8	20	10	25	.50	1.00	500	800	90	125	8	14	60	100	70	Cotton, corn, oats, soybeans
Georgeville silty clay loam	125	250	5	20	10	35	.50	1.00	200	400	90	110	8	14	40	65	46	do
Gilead sandy loam	125	300	10	25	15	30	.50	1.00	500	800	90	125	8	14	50	90	74	do
Eroded phase	125	250	5	20	10	25	.50	1.00	400	700	60	90	5	10	40	70	70	do
Eroded sloping phase	125	250	5	20	5	20	.50	1.00	400	700	75	110	6	12	40	70	40	Forest
Gilead-Susquehanna sandy loams eroded sloping phases.	125	250	5	15	5	20	.50	1.00	300	600	60	90	5	10	40	70	42	Kudzu, forest
Goldston slaty loam	100	250	8	20													33	Cotton, corn, forest
Grady sandy loam			10	25	[1] 1.75	1.50					[1] 150	175	[1] 12	20			13	Forest, pasture, sorghum
Guin sandy loam, steep phase																	6	Forest, kudzu
Helena sandy loam	125	250	5	20	8	25	.50	1.00	500	800	90	115	8	15	40	70	15	Cotton corn, oats, soybean lespedeza.
Herndon fine sandy loam	125	300	10	20	10	25			300	600	90	125	6	12	50	75	71	Cotton, corn, oats
Hiwassee fine sandy loam	250	500	15	35	20	50	1.00	1.50	700	1,200	[2] 150	175	10	15	75	125	94	Cotton, corn, soybeans, oats
Iredell loam	100	200	5	20	10	30	.75	1.50			90	140	8	15	40	70	23	Oats, cotton, soybeans, forest
Iuka silt loam			[1] 15	30	[3] 15	30	[1] 1.00	2.00			[1] 175	225	[1] 12	20			15	Pasture, sorghum, corn, forest
Kalmia sandy loam	200	320	10	25	10	25	.75	1.50	700	1,200	150	175	10	15	60	120	61	Cotton, corn, oats, peanuts
Lloyd clay loam, rolling phase	125	250	5	20	8	25											10	Cotton, corn, oats, forest
Lloyd sandy loam	250	500	15	35	20	50	1.00	1.50	700	1,200	[2] 150	175	10	15	75	125	90	Cotton, corn, soybeans, oats
Lloyd stony loam, rolling phase	125	250	8	20													26	Cotton, corn, kudzu, forest
Louisa clay loam	125	250	5	15	8	20	.50	1.00					5	10			50	do
Rolling phase	100	200	5	20	8	20	.25	.50					5	10			32	Cotton, forest, kudzu
Louisa sandy loam, eroded rolling phase.	125	200	4	12	8	15	.50	1.00	300	600			5	10	40	70	11	Cotton, corn, kudzu, forest
Macon very fine sandy loam	200	300	8	20	10	35	.75	1.50	700	1,000	125	150	10	15	75	100	69	Cotton, corn, oats, soybeans, l
Madison sandy loam	175	300	10	25	10	35	.75	1.50	500	900	[2] 125	150	8	14	50	90	60	Cotton, corn, oats, soybeans
Marlboro sandy loam	250	600	15	35	20	40	1.00	1.50	800	1,500	150	175	10	15	90	140	94	do
Myatt sandy loam					10	25	[1] 1.75	1.50			[1] 150	175	[1] 12	20			8	Forest, pasture, sorghum
Norfolk loamy sand	125	300	6	20	10	30	.50	1.00	500	1,000	90	125	6	12	50	90	85	Cotton, corn, soybeans, oats, p
Norfolk sand	125	250	7	25	8	25	.50	.75	400	700	60	90	6	12	40	65	68	Peanuts, cotton, corn, oats
Sloping phase	100	200	5	20	5	25	.50	1.00	300	600	60	90	5	10	40	70	33	Peanuts, cotton, forest, kudzu
Norfolk sandy loam	250	500	15	40	20	40	1.00	1.50	800	1,500	150	175	10	15	80	125	90	Cotton, corn, soybeans, oats
Deep phase	200	350	10	30	10	30	.75	1.50	600	1,100	150	175	10	15	60	120	89	Cotton, corn, oats, peanuts
Sloping phase	125	300	7	20	15	25	.50	1.00	600	1,000	100	135	8	14	60	100	90	Cotton, corn, oats, soybeans
Plummer sandy loam							[1] 1.75	1.50			[1] 150	175	[1] 12	20			0	Forest, pasture, sorghum
Ruston sandy loam	250	500	15	40	20	40	1.00	1.50	800	1,500	150	175	10	15	75	125	90	Cotton, corn, soybeans, oats
Starr loam	250	500	15	40	20	50	1.00	2.00			175	225	15	20	100	150	53	Corn, cotton, soybeans
Susquehanna clay																	0	Forest, pasture, sericea lespede
Sloping phase	100	175			8	20	.33	.66			90	140	7	14			24	Forest, cotton, sericea lespedez
Susquehanna fine sandy loam	125	250	5	20	10	30	.50	1.00			90	110	8	15	40	70	50	Cotton, corn, oats, soybeans, pedeza.
Wilkes sandy loam																	3	Forest, kudzu
Worsham sandy loam			5	20	10	25	[1] 1.75	1.50			150	200	10	15			11	Sorghum, pasture, forest

[1] Yield obtained on small better-drained situations but not applicable to the soil as a whole.
[2] Sirup produced is dark in color and strong.
[3] Soil is poor for winter oats but fairly dependable for spring oats, although yields are not so large as for winter oats.